

NO LONGER
MANUFACTURED

Cementitious Deck Gypsum Roof Systems

lower energy demands

low-cost noise control

improved fire protection

lower insurance rates

reduced construction costs

high structural strength

design versatility

all-weather installation



USG

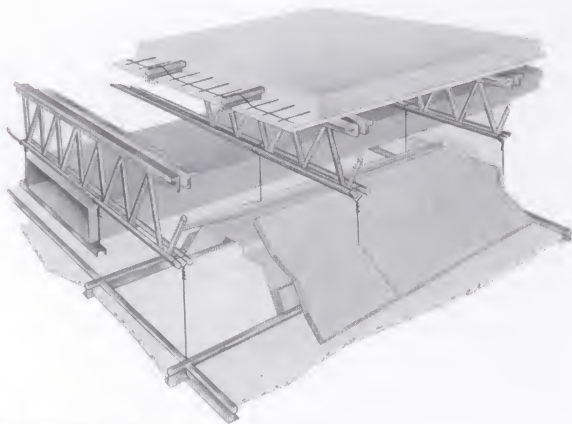
Two Basic Deck Systems

1. Fire-Rated Gypsum Roof Decks of PYROFILL Gypsum Concrete are poured in place over galvanized reinforcing mesh and formboards supported by steel sub-purlins. Formboards are left exposed or a rated finished ceiling is suspended below. The result is a rock-hard, monolithic roof deck system that resists hurricane uplift wind forces up to 125 psf; resists seismic shock well in excess of building code requirements; and has passed the UL Wind Uplift Class 90 test. Gypsum decks are rated noncombustible and their use dramatically reduces insurance rates for lifetime savings. Gypsum sets fast, so roofing can be applied without undue delay. These features make the systems ideal for schools, hospitals, warehouses, industrial construction and other buildings where up to 2-hour fire resistance is required.

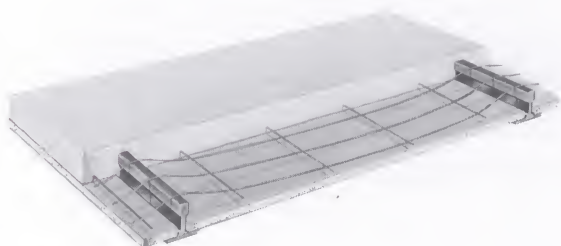
2. USG Service Ceiling Systems provide walk-deck ceilings to permit full access to the interstitial space between the Service Ceiling and the floor above.

Limitations

1. Gypsum roof decks are suitable for normal temperature and humidity conditions. Acid fumes, generally not harmful to gypsum, may affect framing. Where such abnormal conditions prevail, consult a specialist for particular recommendations.
2. Certain recommendations concerning drying and ventilation, expansion and contraction, decorating and roofing must be adhered to for satisfactory performance (see Specifications on page 9 for details).
3. Although SHEETROCK brand Formboard is treated to resist mildew growth, such growth can occur under adverse conditions. See Notes to Architect for details of precautionary measures in notes 1, 2, 3, 4, and 7.



deck with ceiling



basic gypsum deck

Fire Ratings

A choice of fire-rated systems with exposed deck construction, suspended acoustical or drywall ceilings

The UL-tested USG roof deck systems listed below ensure the extra protection required in specific applications. USG's policy of comprehensive testing of complete roof systems offers high-quality decks that meet all major building codes.

UL Design No. P676 (Rating—2 hr.)

Two-in. PYROFILL Poured Gypsum Concrete and KEYDECK Reinforcing Mesh on ½-in. exposed SHEETROCK brand Formboard supported by KEYDECK Truss Tees spaced 32¼ in. o.c. on fireproofed beams 8 ft. o.c. max. System rated 1½ hr. with beams 9 ft. o.c. max. Slab weight: 11 psf.

UL Design No. P503 (Rating—2 hr.)

Two-in. PYROFILL Poured Gypsum Concrete and KEYDECK Reinforcing Mesh on ½-in. SHEETROCK brand Formboard supported by KEYDECK Truss Tees spaced 32¼ in. o.c. and welded to 14-in. steel bar joists spaced 4 ft. o.c. max.; USG Metal Furring Channels spaced 24 in. o.c. wire-tied to joists, ¾-in. SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw-attached to channels, joints unfinished or taped. Restrained assembly rated 2 hr.; unrestrained assembly 1½ hr. Slab weight: 11 psf.

UL Design No. P207 (Rating—1½ hr.)

Two-in. PYROFILL Poured Gypsum Concrete reinforced with KEYDECK Wire Mesh on ½-in. SHEETROCK brand Formboard supported by KEYDECK Bulb Tees spaced 32 in. o.c. and welded to 12-in. steel bar joist 4 ft. o.c. max. and AURATONE FIRECODE Acoustical Panels suspended on an exposed rated grid system. Slab weight: 11 psf.

UL Design No. P229 (Rating—1 hr.)

Two-in. PYROFILL Poured Gypsum Concrete and KEYDECK Reinforcing Mesh on ½-in. SHEETROCK brand Formboard supported by KEYDECK Truss Tees spaced 32¼ in. o.c. and welded to 10-in. steel bar joists spaced 6 ft. o.c. max.; IRMA roof assembly—built-up roofing on slab, maximum 8-in. rigid foam plastic insulation above roofing with crushed stone over insulation, ¾-in. AURATONE FIRECODE Ceiling Panels on a suspended exposed rated grid system, restrained and unrestrained assembly rated 1 hr. Slab weight: 11 psf.

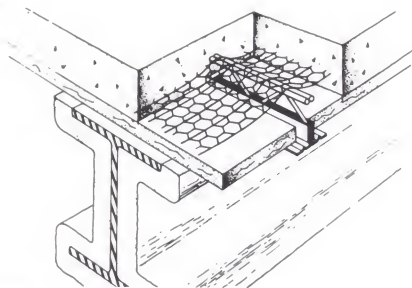
UL Design No. P505 (Rating—1½ hr.)

Two-in. PYROFILL Poured Gypsum Concrete and KEYDECK Reinforcing Mesh on ½-in. SHEETROCK brand Formboard supported by KEYDECK Truss Tees spaced 32¼ in. o.c. and welded to bar joists spaced 4 ft. o.c. max.; IRMA roof assembly—built-up roofing on slab, maximum 8-in. rigid foam plastic insulation above roofing with crushed stone over insulation; USG Metal Furring Channels spaced 24 in. o.c. wire-tied to joists, ¾-in. SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw-attached to channels, joints exposed or finished. Restrained assembly rated 1½ hr.; unrestrained assembly 1 hr. Slab weight: 11 psf.

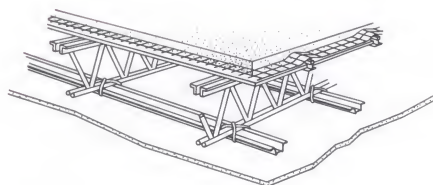
UL Design No. P507 (Rating—1½ hr.)

Two-in. PYROFILL Poured Gypsum Concrete and KEYDECK Reinforcing Mesh on ½-in. SHEETROCK brand Formboard supported by KEYDECK Truss Tees spaced 32¼ in. o.c. and welded to bar joists spaced 4 ft. o.c. max.; IRMA roof assembly—built-up roofing on slab, maximum 8-in. rigid foam plastic insulation above roofing with crushed stone over insulation; light fixtures and dampers, ¾-in. SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw-attached to suspended rated grid system, joints finished. Restrained assembly rated 1½ hr.; unrestrained assembly 1 hr. Slab weight: 11 psf.

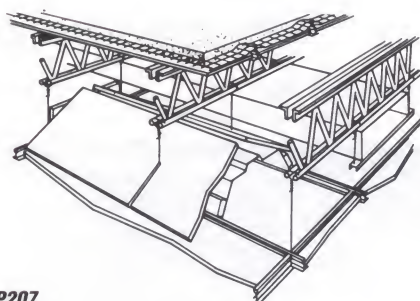
UL Designs



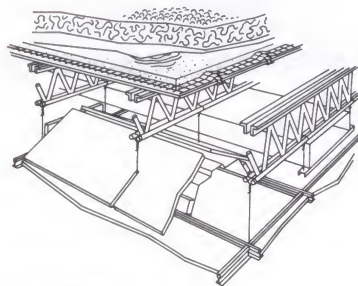
UL Des. P676



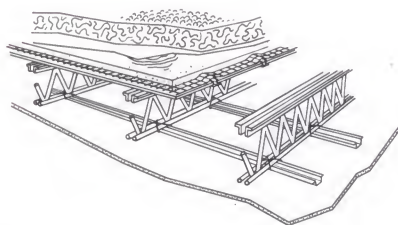
UL Des. P503



UL Des. P207



UL Des. P229 & P507



UL Des. P505

PYROFILL Gypsum Concrete is mill formulated and composed of calcined gypsum and wood chips or shavings. It is mixed at the job-site with clean water only and poured in place over permanent formboards. Thermal resistance (R) value is 0.67 per inch. It complies with ASTM C317.

Steel sub-purlins vary in size, weight and shape and are selected according to required span and loading (see page 5). They provide lateral bracing, anchorage against uplift, and restrict deck movement due to temperature change. Sub-purlin spacing accommodates formboard with a slight tolerance for ease of formboard placement. Sub-purlins are spaced approx. 32 $\frac{1}{2}$ in. o.c. and are welded to the structural framing members. USG neither manufactures nor sells bulb or truss tee sub-purlins. Roll-formed USG sub-purlins are available 18 ga. and 16 ga.

Reinforcing mesh for gypsum concrete is one of the following types:

1. KEYDECK—A galvanized wire mesh, woven with 16-ga. straight wires and 19-ga. diagonal wires.
2. 48-1214—A galvanized, welded wire mesh with 12-ga. longitudinal wires at 4 in. o.c. and 14-ga. transverse wires at 8 in. o.c.

The effective cross-sectional area of reinforcing mesh placed at 90° to the sub-purlins is .026 sq. in. per foot of mesh width. USG neither manufactures nor sells reinforcing mesh.

SHEETROCK brand Formboard is a rigid gypsum board, treated to resist mildew* effectively where adequate ventilation is provided. Fire ratings are available with 2-in. gypsum slabs and exposed tees. Ideal for almost every roof deck need, concealed or exposed. Makes economical ceilings for warehouses, light manufacturing buildings, schools—any construction where durability and low cost are desired.

*Although SHEETROCK brand Formboard is treated to resist mildew growth, such growth can occur under adverse conditions. See Notes to Architect for details of precautionary measures in notes 1, 2, 3, 4, and 7.

Structural Strength

To withstand hurricane winds, wind uplift and roof loads . . .

USG roof deck systems form a monolithic unit that structurally integrates the roof deck with the roof framing. Sub-purlins, securely welded to bar joists or purlins, resist uplift and transmit slab loads. Reinforcing mesh provides tensile strength, enables the slab to transmit the load to the framing. With truss tees, the gypsum fill flows through the open web to mechanically key all components into a structural unit. The resulting rigid diaphragm firmly resists horizontal and vertical loading from wind and seismic forces.

Gypsum concrete decks have high structural strength and a hard surface. In tests, standard assemblies supported uniform roof loads over 450 psf when wet and 700 psf when dry. At a dry density of 50 pcf for PYROFILL Gypsum Concrete, the compressive strength of the slab is 500 psi min. This conforms to ASTM C317 for Class A gypsum concrete.

USG roof decks with long, clear spans can be designed for fewer bar joists to optimize design.

In hurricane areas, such as Florida, standard gypsum roof decks have withstood repeated fierce blows without damage. This is because USG roof decks resist uplift action by nearly four times the normal requirements of 35 psf when constructed with bulb or truss tee sub-purlins welded to the primary framing.

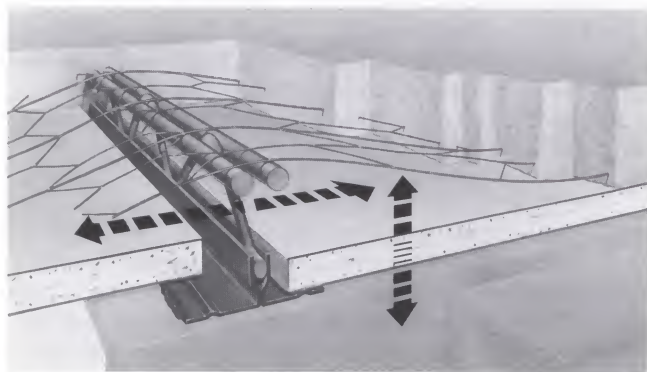
UL Wind Uplift Class 90 has been assigned to a poured gypsum concrete roof deck assembly based on qualified testing (see NM

513 in UL Roofing Materials and Systems Directory). The system tested consisted of PYROFILL Gypsum Concrete over SHEETROCK brand Formboard with bulb tees, KEYDECK Mesh and roof covering attached with NAIL-TITE Nails. This USG assembly successfully withstood the rigorous test—while most competitive deck systems have not. Extended coverage insurance rates are generally lower for assemblies having passed the test, especially in Gulf Coast and Prairie States where high wind velocities are prevalent.

To resist seismic shock or to reinforce the building . . .

USG roof decks provide excellent lateral bracing. They have withstood some of the most severe earthquakes in California and have been approved as rigid diaphragms in Los Angeles and in many of the 1,000 cities which use the Uniform Building Code.

USG poured gypsum roof decks with bulb tees or truss tees structurally tie the framing system together to reinforce the building and provide resistance to wind and seismic loads.



Open-web construction allows gypsum fill to flow through truss tee to embed it in a solid mass of gypsum concrete. This, plus welding of truss tee to supports, provides strong composite resistance to shear and uplift. The mesh provides tensile strength to reinforce the deck. Cracking and deflection caused by impact and seismic shock are minimized.

Economy

USG decks give more for less . . . in fire-rated systems

Initial savings can amount to thousands of dollars in construction investment when USG fire-rated roof decks are specified. A UL 2-hr. fire-rated system often costs only a few cents per sq. ft. more than a non-rated system . . . and considerably less than other types of 2-hr. UL fire-rated decks. USG decks enjoy ready acceptance from major code bodies and insurance companies. Savings are achieved through the unique advantages that USG roof decks offer in strength, fire resistance and durability.

In Fast Installation

Up to 30,000 sq. ft. of gypsum deck can be poured in one day. The quick-setting action of gypsum concrete permits roofing almost immediately. There's no wait for curing as with ordinary lightweight concrete decks; no costly delays in erection schedules.

USG roof decks can be poured in cold weather; in any weather in which men can work. The quick-setting action of gypsum concrete makes it one of the best roof deck materials for winter construction. The exothermic reaction in the slab protects it from freezing before set takes place and the slab is capable of carrying design loads.

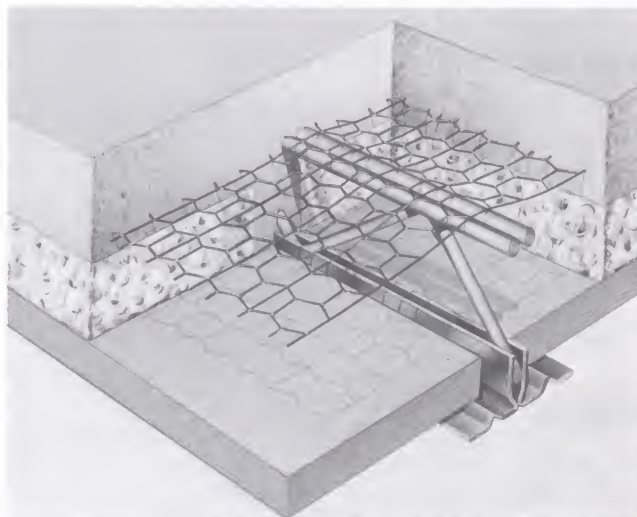
In Reduced Construction Costs

USG gypsum roof decks meet Factory Mutual Noncombustible Classification to qualify for lowest extended-coverage insurance

rates without the clear-span limitations imposed upon steel roof deck designs. With gypsum decks, bar joist spacing can be optimized for major cost reductions over steel and lightweight concrete systems.

In Total Value

USG gypsum roof decks are the best value in the industry. They offer maximum economy without sacrificing safety or strength. They resist rot, warpage and deterioration to cut maintenance costs and also reduce insurance rates.



double-board poured gypsum deck



Northlake Mall, Atlanta, GA
Architect: Toombs, Amisano & Wells

Design Data

Bulb Tee Sub-Purlins

Sub-purlin		Total safe uniform load (psf) with gypsum decks on spans shown—ft. (mm)														Max. eave overhang—ft. (mm)
Type	Weight—lb./ft. (kg/m)	5' 0" (1524)	5' 6" (1707)	6' 0" (1829)	6' 6" (1981)	6' 8" (2032)	7' 0" (2134)	7' 6" (2286)	8' 0" (2438)	8' 6" (2591)	9' 0" (2743)	9' 6" (2896)	10' 0" (3048)	10' 6" (3200)	11' 0" (3353)	
112	1.40 (2.08)	67	56	47	40											2' 2" (661)
158	1.60 (2.38)	92	76	64	54	52	47									2' 9" (838)
168	1.75 (2.60)		109	91	78	74	67	58	51							3' 4" (1016)
178	2.05 (3.05)			119	101	95	87	76	66	59	52					3' 11" (1194)
218	3.00 (4.46)						119	103	91	80	72	64	58	52	48	4' 10" (1473)
228	3.65 (5.43)								129	114	102	91	82	74	68	5' 10" (1778)

Loads based on 3-span condition and 39,600 psi design stress for 112, 158, 168, 178 tees and 33,000 psi for others. Loads are for bulb tee acting alone, live-load deflection L/240 or less and 32% spacing; for 24% spacing, multiply by 1.32. Eave overhang based on 45 psf load. With nailers, angles, gutters or soffits supported by tees, calculate overhang separately. For wt./sq. ft., multiply wt./lin. ft. by .49 for 24% tee spacing, .37 for 32% spacing and .25 for 48% spacing. For conversion to metric pascals (Pa.), multiply loads shown by 47.88. Note: Bulb tee height must be sufficient to project 1/4" min. above top surface of formboard.

Truss Tee Sub-Purlins


Sub-purlin	Total safe uniform load (psf) with gypsum decks on spans shown—ft. (mm)																Max. eave overhang—ft. (mm)	
Type	Weight—lb./ft. (kg/m)	5' 0" (1524)	5' 6" (1707)	6' 0" (1829)	6' 6" (1981)	6' 8" (2032)	7' 0" (2134)	7' 6" (2286)	8' 0" (2438)	8' 6" (2591)	9' 0" (2743)	9' 6" (2896)	10' 0" (3048)	10' 6" (3200)	11' 0" (3353)	11' 6" (3505)		12' 0" (3658)
5-6-17-1½"	1.03 (1.53)	65	54	45														2'7" (787)
5-6-17-2"	1.03 (1.53)	76	63	53	45	43	39											2'9" (838)
2-5-17-2"	1.20 (1.79)	119	90	82	70	67	61	53	46	41								3'6" (1067)
1-5-17-2"	1.26 (1.88)		107	90	76	73	66	57	50	45	40							3'7" (1092)
000-5-14-2"	1.78 (2.65)						89	77	68	60	54	48	43	39				4'2" (1270)
5-6-17-2½"	1.05 (1.56)	96	80	67	57	54	49*	43*	38*									3'1" (940)
2-3-17-2½"	1.27 (1.89)			107	91	86	78	68	60	53*	47*	43*						3'11" (1194)
1-3-17-2½"	1.32 (1.96)			116	98	94	85	74	65	58	52	46*	42*					4'1" (1245)
000-3-14-2½"	1.85 (2.75)						101	89	78	70	63	57	51	47				4'9" (1448)
5-6-17-3"	1.07 (1.59)	118	98	82	70*	67*	60*	53*	46*	41*								3'5" (1041)
2-3-17-3"	1.30 (1.93)			131	111	106	96	84	73*	65*	58*	52*	47*	43*				4'4" (1321)
1-3-17-3"	1.35 (2.01)				121	115	104	91	80	71	63*	56*	51*	46*	42*			4'6" (1372)
000-3-14-3"	1.88 (2.80)						141	123	108	96	86	77	69	63	57	52	48	5'3" (1600)

Loads based on 3-span condition, truss tee acting alone, and 32% spacing. For 24% spacing, multiply by 1.32; for 2-span condition, multiply by .8; for single-span condition, multiply by .72. Eave overhang based on 45 psf load. With nailers, angles, gutters or soffits supported by tees, calculate overhang separately. For wt./sq. ft., multiply wt./lin. ft. by .49 for 24% tee spacing; .37 for 32% spacing and .25 for 48% spacing. For conversion to metric pascals (Pa.), multiply loads shown by 47.88.

* Welding both sides of sub-purlin at all intersections with supports is recommended for better lateral stability for formboard installation.

Note: Truss tee height must be sufficient to project 1/4" min. above top surface of formboard or embedded insulation.

USG Sub-Purlin

Sub-purlin			Total safe uniform load—psf ⁽¹⁾													Max. eave overhang ⁽²⁾
Type	Wt.—plf		Span													
			4' 0"	4' 6"	5' 0"	5' 6"	6' 0"	6' 6"	7' 0"	7' 6"	8' 0"	8' 6"	9' 0"	9' 6"	10' 0"	
	18-ga.	0.95	42	32	27	23										1' 11" 2' 0"
	16-ga.	1.10	51	41	33	27	23									

(1) Load based on 3-span condition and allowable design stress of sub-purlins acting alone at nom. 24" o.c. or a max. live load deflection of L/240 deck acting compositely, whichever governs. For 2-span condition, multiply loads by 0.80 or by 0.72 for simple spans. Max. allowable superimposed load on plank is 50 psf.

(2) Based upon 45 psf load. Calculate separately for sub-purlins supporting nailers, angles, gutters, or soffits.

Nail-Holding Power⁽¹⁾

Description of nail	PYROFILL gypsum concrete		
	Removal—1 day	Removal—7 days	Removal—slab dry
1 1/2" ES NAIL-TITE—plain finish ⁽²⁾ (1 1/2" penetration)	67 ⁽³⁾ (30.4)	77 (34.9)	136 (61.7)
1 1/2" SIMPLEX gypsum deck—plain finish ⁽⁴⁾ (1 1/2" penetration)	6 (2.7)	23 (10.4)	119 (54.0)
6d cornice—plain finish (1 1/2" penetration)	3 (1.4)	18 (8.2)	152 (68.9)

(1) Resistance to direct pull in lb. (kg), for nails placed 24 hr. after pouring slab. Test slabs had 2" min. thickness and dry density of 48 pcf for PYROFILL. Nail-holding power decreased at densities less than those cited.

(2) Manufactured by E.S. Products, Bristol, RI, and recommended for smooth coat-type roofing.

(3) Provides min. 40-lb. immediate holding power required by roofing manufacturers.

(4) Manufactured by Simplex Nail & Mfg. Corp., Americus, GA.

Design Weight (For Fire-Rated and Non-Rated Decks)

Deck system	Dry deck weight psf (kg/m ²) ⁽¹⁾
2" PYROFILL Gypsum Concrete	11 (53.7)
1/2" SHEETROCK brand Formboard ⁽²⁾	

(1) Weight of sub-purlin or roofing not included. PYROFILL concrete density approx. 50 lb. per cu. ft.

(2) Sub-purlins should extend min. of 1/4" above the top surface of formboard.

Physical Properties—Dimensions in Inches (mm)

Bulb tee		Type	B	C	D
		112	3/4 (9.5)	1 1/2 (38.1)	1 1/2 (38.1)
		158	3/4 (9.5)	1 1/2 (39.7)	1 1/2 (41.3)
		168	7/8 (11.1)	1 1/2 (38.1)	2 (50.8)
		178	7/8 (14.3)	1 1/2 (41.3)	2 (50.8)
		218	1 1/8 (17.5)	2 1/2 (54.0)	2 1/2 (54.0)
		228	1 1/2 (22.2)	2 1/2 (52.4)	2 1/2 (58.7)

Truss tee		Type	B	C	Chord wire gage
		5-6-17-1 1/2"	3/4 (14.3)	1 1/2 (44.6)	5
		5-6-17-2"	3/4 (14.3)	2 (50.8)	5
		2-5-17-2"	7/8 (16.7)	2 (50.8)	2
		1-5-17-2"	7/8 (18.3)	2 (50.8)	1
		000-5-14-2"	3/4 (22.2)	2 (50.8)	000
		5-6-17-2 1/2"	3/4 (14.3)	2 1/2 (63.5)	5
		2-3-17-2 1/2"	7/8 (18.3)	2 1/2 (63.5)	2
		1-3-17-2 1/2"	3/4 (19.1)	2 1/2 (63.5)	1
		000-3-14-2 1/2"	7/8 (23.0)	2 1/2 (63.5)	000
		5-6-17-3"	3/4 (14.3)	3 (76.2)	5
		2-3-17-3"	7/8 (23.0)	3 (76.2)	2
		1-3-17-3"	3/4 (19.1)	3 (76.2)	1
		000-3-14-3"	7/8 (23.0)	3 (76.2)	000

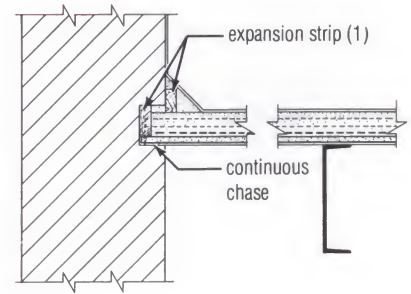
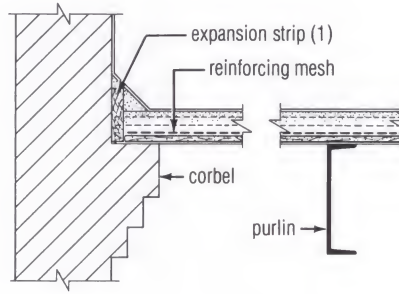
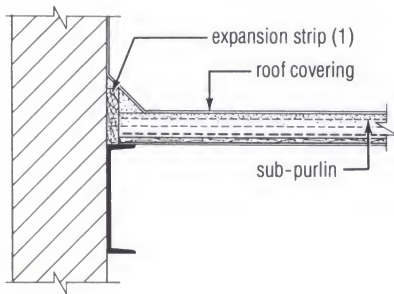
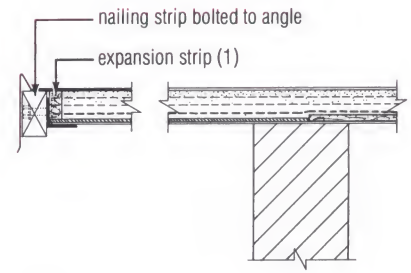
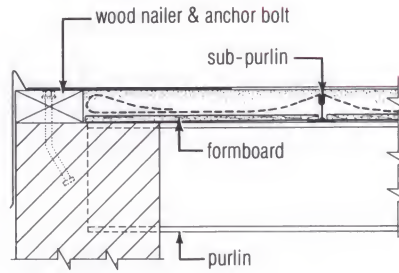
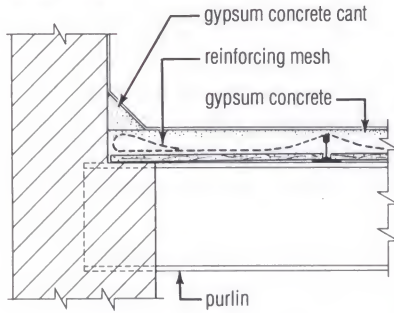
Properties shown are taken from data furnished by manufacturer.

Details

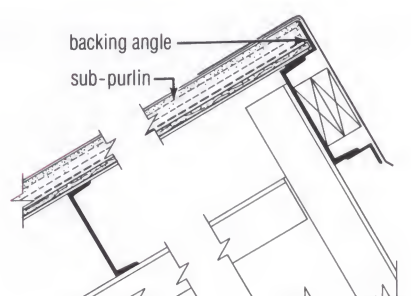
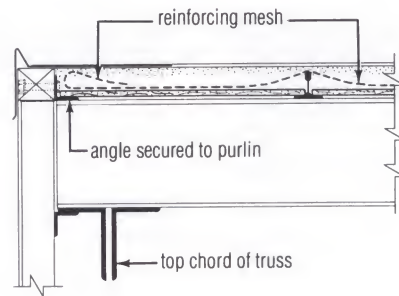
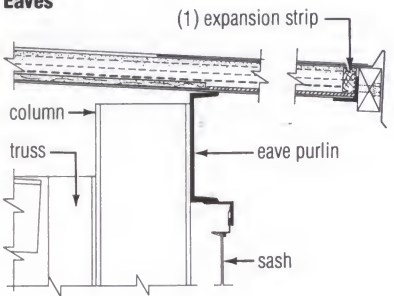
Application over beams and bar joists

scale: $\frac{3}{4}" = 1'-0"$

Wall details

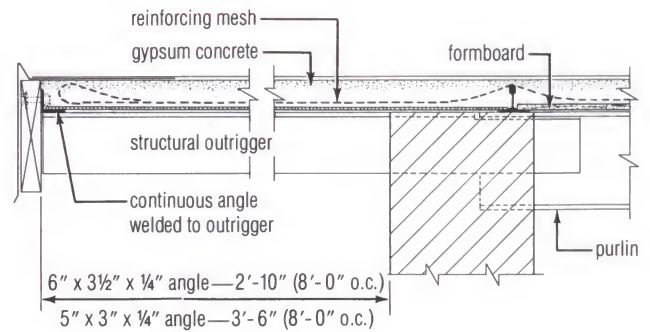
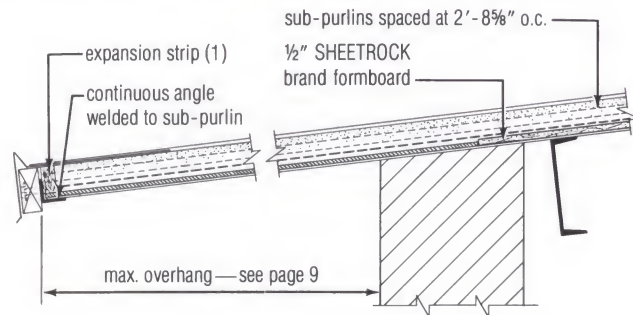


Eaves



Eave & gable overhang

(overhang based on 45#/sq' total load)

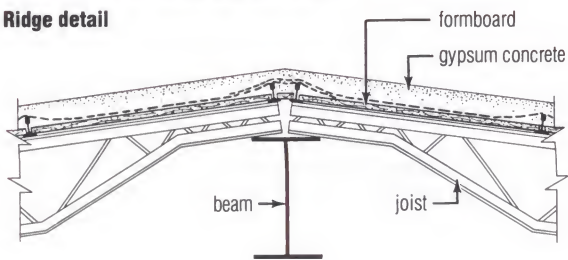


(1) Expansion strips are not recommended for seismic Approved Diaphragm design. See page 14 for Seismic Detail

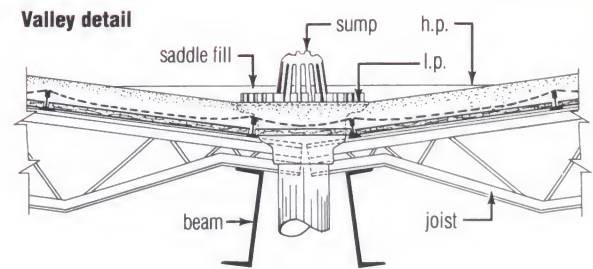
Details

Application over beams and bar joists

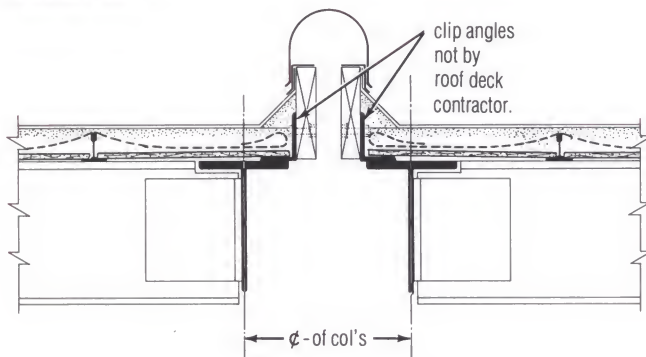
Ridge detail



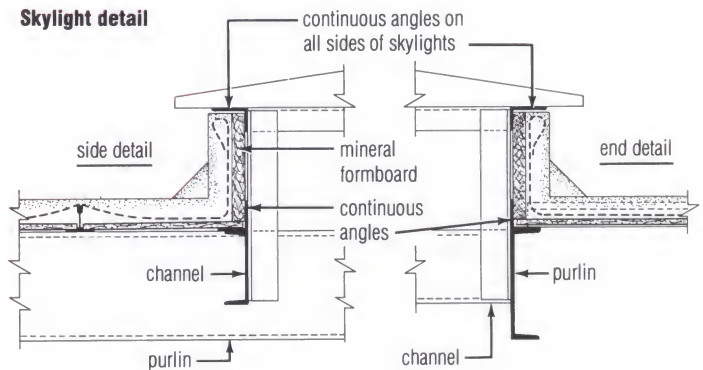
Valley detail



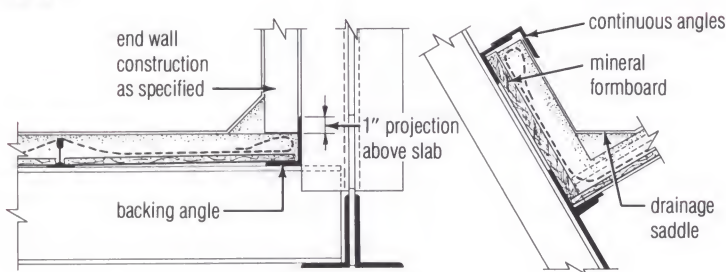
Expansion joint



Skylight detail

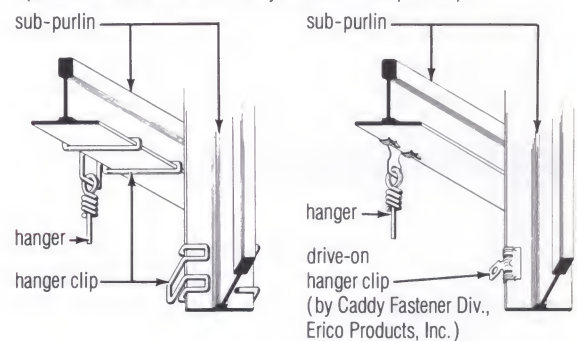


Curbs



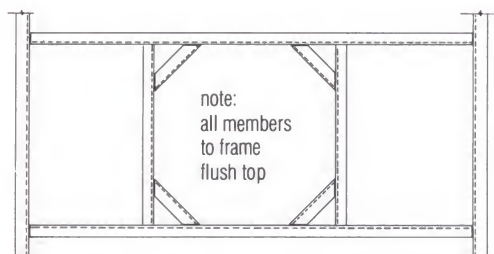
Hanger details for suspended ceilings

hanger and hanger clips—not by Roof Deck Contractor
(a convenient lather's wire tie may be used for suspension)

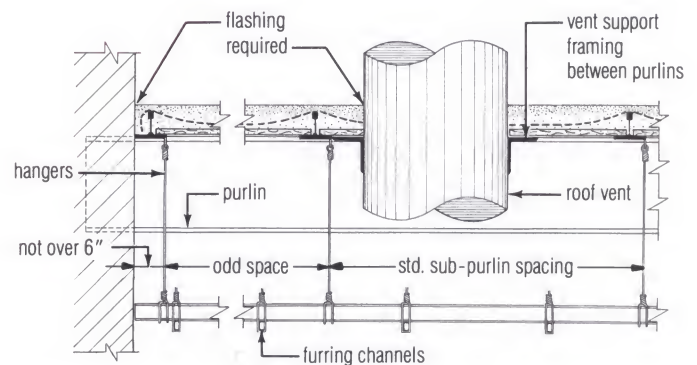


Typical framing around openings larger than 30"

openings less than 30" to be framed with sub-purlins



Note: all miscellaneous structural steel, such as channels, wood nailers, angles, hangers and channel grillage, attached to roof framing, are not by roof deck contractor.



Suspended ceilings

Service Ceilings

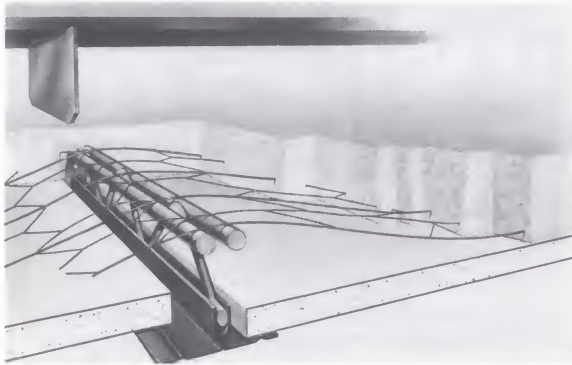
One of the most important innovations in the contemporary design and construction of hospitals and laboratories has been the addition of "interstitial space" between floors. The concept permits mechanical and electrical alterations resulting from rearrangement of facilities on a floor to take place in a horizontal working area between floors rather than on the floor undergoing change. This has the triple advantage of minimizing the amount of mechanical and electrical work that has to be done on an occupied floor, eliminating the problem of mechanics disrupting the activities of an adjacent floor to make changes through the floor-ceiling system, and sharply reducing costs, since partitions and floor-ceilings don't have to be breached to get at service lines.

The first system to be used was a poured-in-place system utilizing ½-in. SHEETROCK brand Formboard, truss tee sub-purlins and cross tees, reinforcing wire mesh and PYROFILL Gypsum Concrete.

Poured-in-place USG Service Ceiling Systems offer wide flexibility of design, providing lightweight, low-cost noncombustible construction. Materials are easily cut and drilled to permit quick alterations with a minimum of noise and disruption.

Limitations

1. Poured-in-place gypsum service ceilings are suitable for normal temperature and humidity conditions. Acid fumes, generally not harmful to gypsum, may affect framing materials.
2. Service ceilings are intended only for walking and for construction live loads. All utility and mechanical equipment located in the interstitial space is to be supported from the floor above. These ceilings should not be used for material storage.
3. Heavy loads, during either construction or use and maintenance functions, may require planking to distribute loads to acceptable unit load levels.
4. To reduce dusting, the top surface of gypsum slab should be sealed in walking areas. Floor covering materials should be used for paths of regular and frequent use.



service ceiling cross section

Approved Seismic Diaphragm

USG poured gypsum roof decks with truss tees and reinforcing mesh offer an approved construction to resist seismic shock. The gypsum fill flows through the truss tee to form a rigid diaphragm with excellent resistance to shear and uplift. Design procedure is similar to that of reinforced concrete using gypsum stress values allowed by the applicable code (see table). NOTE: Wire mesh reinforcement should be lapped at least 4 in. or one mesh on ends and edges, whichever is greater. Bulb Tees and USG Tees are not recommended as shear transfer elements.

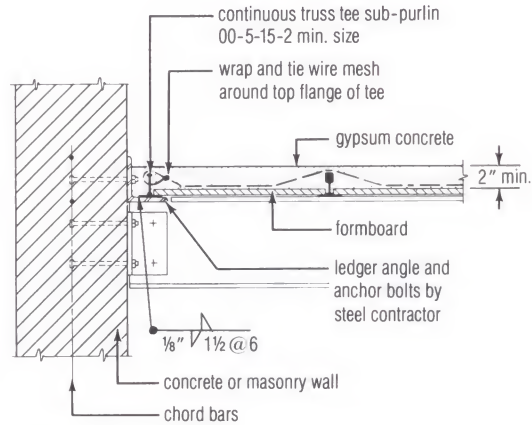
Allowable Shear—Reinforced Gypsum Concrete

Gypsum concrete thickness, in. ⁽¹⁾	Reinforcing mesh type	Allowable shear values, lb. per lin. ft.
		PYROFILL with truss tees
2	4"x8" #12—#14	840
2	KEYDECK	1060
2½	4"x8" #12—#14	890
2½	KEYDECK	1120

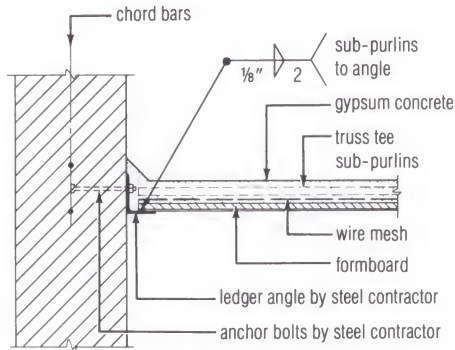
(1) Based on 500 psi compressive strength gypsum concrete Class A.

Sub-purlins parallel to shear-resisting elements

Truss tee shear transfer element

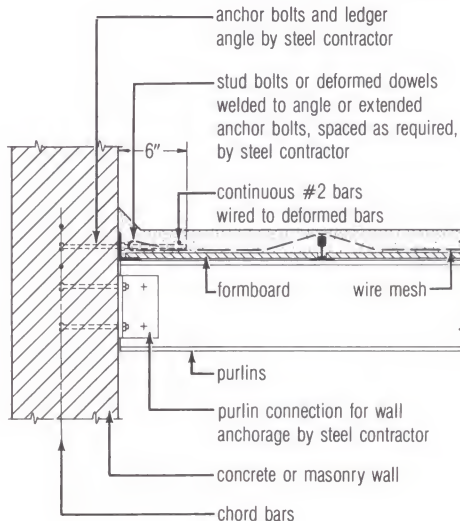


Sub-purlins perpendicular to shear-resisting elements



Sub-purlins parallel to shear-resisting elements

Rod dowel shear transfer element



purlins welded to steel framing, have an average uplift resistance equal to more than 125 lb. per sq. ft. Reference: Armour Research Foundation Test M1068.

- 7 Roofing**—Once PYROFILL Gypsum Concrete has set, the complete built-up roof covering should be installed as soon as practical, preferably within three days after pouring, to protect fill from excessive wetting from rain or snow and to develop optimum nail-holding power. For built-up roofing application direct to fill, a min. 40-lb. coated base sheet, or equal, nailed dry is recommended for the first ply. Drive nails into wet slab as soon as possible; rusting increases holding power. See page 5 for nail-holding values.

The provision in this specification for a meeting between general, roof deck and roofing contractors to schedule the work should also be included in the roofing specification.

- 8 Heavy Loads**—Although the reinforced PYROFILL Gypsum Concrete deck slab will carry loads in excess of 100 lb. per sq. ft. with an adequate safety factor, the sub-purlins or bar joists govern the safe load limit. All superimposed concentrated loads, such as flagpole bases, water tanks and ventilating fans, must be directly or indirectly supported on steel framing, not on the gypsum slab.

- 9 Suspended Ceilings** under gypsum roof decks should be hung from the structural steel frame. If hung from the roof deck, hangers should be attached to sub-purlins, never to the gypsum slab alone. When hung from sub-purlins, the sub-purlins must be capable of supporting the total weight including ceiling load with a resultant deflection not to exceed $\frac{1}{360}$ of their span. Attachment hangers and channel grillage are not furnished by the roof deck contractor. See USG System Folders in this series for descriptions and details of ceiling assemblies.

- 10 Sub-Purlins** should extend at least $\frac{1}{4}$ in. above top surface of formboard. Except for decks designed as horizontal diaphragms, end joints of sub-purlins may be aligned or staggered at contractor's option. When joints are aligned, reinforcing mesh must be continuous over the joint with mesh edge at least 6 in. from joint. Decks designed as horizontal diaphragms to resist seismic and hurricane forces should have staggered sub-purlin end joints.

Part 1: General

- 1.1 Scope**—Specify as required to suit project conditions.

1.2 Qualifications

Installation of poured gypsum roof deck shall be by a USG-approved roof deck contractor.

1.3 Submittals

- A** The roof deck contractor shall prepare and submit shop drawings before the work begins. These shop drawings shall be in agreement with poured roof deck specifications and details as provided.
- B** Prior to pouring gypsum deck, representatives of the general contractor, roof deck contractor and roofing contractor shall meet and agree to procedures and coordination of operations to ensure that decking is roofed within three days after pouring.

1.4 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages or bundles and stored off the ground and in a place providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.5 Environmental Conditions

Ventilation shall be provided for any plenum or joist space between roof deck and ceiling assemblies. The venting of enclosed air spaces shall be accomplished by natural or artificial means, both during and after construction of the building.

Part 2: Products

- 2.1 Sub-Purlins:** (Bulb tees produced from prime billet steel or rail steel ASTM A499) (KEYDECK Truss Tees) (USG Sub-Purlins.)

- 2.2 Cross Tees:** $1\frac{1}{4} \times \frac{1}{2} \times 0.023$ " thick, cold-rolled galvanized steel (painted).

2.3 Permanent Formboard

- A** SHEETROCK brand Formboard, $\frac{1}{2}$ " thick, 32" wide, treated, in lengths equal to main purlin spacings (12' max.).

- 2.4 Reinforcing Mesh:** 48-1214 galvanized steel, welded wire mesh or KEYDECK Galvanized Steel, woven wire mesh. Effective cross-sectional area of mesh at right angles to sub-purlins shall be not less than 0.026 sq. in. per ft. of mesh width.

- 2.5 Gypsum Concrete:** PYROFILL, mill formulated, composed of calcined gypsum and aggregates to comply with ASTM C317.

- 2.6 Water:** Potable and containing no impurities that affect the setting of gypsum.

- 2.7 Mixes:** Gypsum concrete shall be mixed with clean water only, using $8\frac{1}{2}$ gallons per 80 lbs. PYROFILL Gypsum Concrete.

Part 3: Execution

3.1 Sub-Purlin Installation

Place sub-purlins with end joints to bear on roof supports. Line of end joints (may be aligned) (shall be staggered (see Notes to Architect, No. 10)). Weld each sub-purlin to supports at each contact point. Use fillet welds $\frac{1}{2}$ -in. min. length placed on (alternate) (both) sides of sub-purlins. For fire-rated assemblies, place and weld sub-purlins in accordance with specifications shown in UL fire test listings. For seismic diaphragms, see applicable details on page 8.

3.2 Formboard Installation

Place formboards on sub-purlin flanges with all end or cross-joints supported, forms to fit neatly on all four edges. Cut forms to fit at walls, curves and openings as required. Install cross tees to support end joints of formboards not supported by roof framing. Lay no more formboard than can be covered by completed slab on the same day.

3.3 Reinforcement Placement

Place reinforcing mesh with heaviest wires at right angles to sub-purlins. If KEYDECK Mesh is used, place 16-ga. wires at right angles to sub-purlins. Lap mesh ends at least 6 in.; do not lap sides of mesh. (Place continuous mesh over aligned sub-purlin end joints keeping sides at least 6 in. away from joints.) For fire-rated assemblies and seismic diaphragms, lap mesh sides (4 in.) (6 in.). Cut mesh to fit at wall, curbs and openings and carry mesh into all areas where gypsum concrete is poured.

3.4 Gypsum Concrete Deck Installation

Mix gypsum concrete and pour 2-in. min. depth over formboards, $\frac{1}{4}$ -in. min. over sub-purlins. Screed all surfaces to a smooth, even plane ready to receive waterproof roof covering specified in another section. After pouring, leave roof deck free and clean for other trades.

For product information and services, contact:

**The Poteet Group
310 Sardis View Lane
Charlotte, NC 28270
(704) 364-2543
Fax (704) 366-9721**

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Note: All products described here may not be available in all geographic markets. Consult your local USG sales office or representative for information.

United States Gypsum Company
125 South Franklin Street
P.O. Box 806278
Chicago, IL 60680-4124
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D O N N

Access Floor Systems

S A 1 0 2 7

USG Interiors, Inc.



USG

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DONN **Access Floors** **Functional** **Effectiveness**

Enhanced **Comfort**

Flexible **Intelligent**

Personal computer workstations, Fax transmission, caller ID telephones and video conferencing play an important role in today's business environment.

More and more facilities demonstrate clear vision by adopting important architectural advances that enable their owners to take full advantage of the technological advances of today . . . and tomorrow.

DONN access floors empower companies to quickly capitalize on changes in technology by eliminating structural constraints. As a result, facility managers are assured that they can bring the point of access for electricity, water, data transmission, conditioned air and telecommunications to any place in the building.



DESIGNAID analysis

For Offices, DONN access floors help streamline office layout modifications, furniture and equipment changes and variations in user requirements by providing ready access to power lines, communications and data transmission cables, plumbing lines and HVAC systems. The systems are enhanced with Krantz air diffusers that efficiently deliver air to specific and general comfort zones. SERVICENTER assemblies bring power, telecommunication and data services together for workstation access. Systems include ULTIMA floors for new and renovated office spaces as well as the new LOW-LOC system specifically designed for remodeled space.

For Data Centers, DONN access floors help expedite computer system installations, rearrangement and repair. The specially designed DONN access floor systems provide the flexibility required for effective wire management, HVAC control, access to fire-suppression systems and sensing devices, and the quiet comfort required in control rooms and data entry areas.

For You, DONN access floors come with a complete support service. Our *DesignAid Cost Analysis* provides decision makers with cost information to help evaluate the true costs and benefits of DONN access floor systems versus traditional construction and distribution systems.

The model calculates material and labor costs, depreciation, tax credits, move costs, cash flows and total life cycle costs for both an access floor and a competitive system. It also supplies complete scale drawings. What's more, DONN access floors are *made in America* for use with both English and metric standard designs.

Floor Systems for OFFICES

Access floor systems are the ideal choice for new offices or for renovating older office space. **DONN** access floors adapt quickly and easily to changing office layouts, furnishings and equipment.

Access floors enable changes in power, telecommunications and HVAC systems with minimal disruption and expense. Each access floor is comprised of selected floor panels in combination with supporting pedestals. The **ULTIMA** and **WOOD-LOK** panels, together with associated understructure, are the ones typically recommended for office system applications. **ULTIMA** floors are the absolute best for access, stability, sound control and overall performance.

The **LOW-LOC** system is especially designed to give existing office space the advantages of access floors without structural alterations to the building.

DONN access floors for offices are designed for management of essential wiring services including underfloor air distribution within a Control Plenum System.



Krantz KB-200 air diffusers in **DONN** access floor systems, left, right and on front cover.



ULTIMA Access Floors

ULTIMA access floors are the best panels available for office use. Installed as totally integrated systems, ULTIMA floors provide superior long-term performance and exceptional safety while providing the ease of maintenance you expect from an access floor system.

Tops in performance

- Quiet, solid, rigid feel underfoot.
- Withstands heavy rolling loads.
- Two panel grades, ULTIMA for general offices and ULTIMA HD for extremely high traffic areas, such as elevator and entrance lobbies.

Built for safety

- Noncombustible, lightweight, maximum strength cement fill in welded steel construction.
- High ultimate load capacity for safety and long-term performance.
- Engineered for a high safety factor and value.

Ease of installation and maintenance

- Interchangeable ULTIMA and ULTIMA HD for high-abuse and special service applications.
- Panels are installed with CORNERLOC, FreeStanding or LOW-LOC understructures.
- Lighter than heavy concrete panels.



Choice of optional colors for Krantz diffusers allows blend of diffusers into carpeting.

WOOD-LOK Access Floors

WOOD-LOK access floors are the economical alternative for offices. WOOD-LOK access floors provide flexibility with adequate sound control.

Economical performance

- Meets Class A fire rating per ASTM E84.
- Recommended for normal load conditions.

Easy to handle and install

- Lightweight panel for ease of installation and removal.
- Facilitates cutting.

Solid construction

- High-quality galvanized steel construction.
- Strong particleboard core resists deflection.



Access Floors For Offices Selection Guide

To determine which panel and understructure combination is best for you, analyze the structural performance needed for your project. Select the combination that achieves the required values.

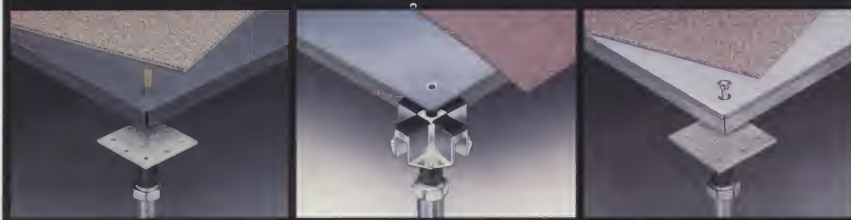
System		Rated Ultimate Load (lbs.)	Safety Factor	Rated Concentrated Load (lbs.)	Rated Rolling Load (lbs.)	Impact Load (lbs.)	Recd. Finished Floor Height ⁽¹⁾
Panel	Understructure						
ULTIMA							
ULTIMA	CORNERLOC	2900	2.9	1000	600	100	Up to 36"
ULTIMA	FreeStanding	2900	2.9	1000	600	100	Up to 12"
ULTIMA HD	CORNERLOC	3500	2.1	1700	1250	175	Up to 36"
WOOD-LOK							
WL-1000	WOOD-LOK	2000	2.0	1000	2000	120	Up to 24"

Rated system loads shown are recommended by USG Interiors and tested in accordance with CISC Testing Standards. Performance testing of access floors for office systems conducted to acceptable deflection of 0.100" or less.

†For higher finished floor heights, contact Technical Services at 1-800-522-3666.



Office Systems Understructures



CORNERLOC

Understructure

Mechanically fastens each floor panel at all four corners, ensuring rigidity, lateral stability.

- Heavy duty screw fasteners securely lock down panels, providing firmness and quiet comfort.
- Gravity-lock collar on pedestal ensures system levelness.

FreeStanding

Understructure

Provides easier access to the underfloor plenum.

- Special trapezoid-shaped flanges on the FreeStanding pedestal head hold panels in place and provide panel edge support.
- Pedestal head is constructed of die-cast aluminum.

WOOD-LOK

Understructure

Locks each floor panel directly to pedestal head at all four corners with corner fasteners.

- Provides a quiet, stable system.
- Gravity-lock collar on pedestal ensures system levelness.

Seismic Applications for Office Systems

(For use with USG Interiors panel/systems)

Understructure Pedestal Base Assembly	Seismic Zones 0	1	2A	2B	3	4
CORNERLOC 1" ϕ tube 4" x 4" steel baseplate (Embossed)	6"-31" FFH	6"-16" FFH	6"-16" FFH	6"-12" FFH	6"-8" FFH	—
4" x 4" x 1/4" steel baseplate	32"-36" FFH	17"-28" FFH	17"-28" FFH	13"-26" FFH	9"-24" FFH	6"-18" FFH

Above data based on UBC Code-1991 for general office applications, I=1.0.

For higher finished floor heights (FFH) and other understructures or code requirements, contact Technical Services at 1-800-522-3666.

Low-LOC Access Floors

The Low-LOC access floor system by USG Interiors can be installed at finished floor heights of only 3" to 5" and still accommodate all your high-tech support service needs. The Low-LOC system is especially suited for office renovation jobs. It gives old buildings a new lease on life because it adjusts to create a completely level floor over a wide range of slab conditions. This eliminates leveling problems with furniture and partitions. It also makes the system ideal for the quick installation of carpet tile. Plus, Low-LOC doesn't use expensive, non-adjustable plastic floor modules that limit wiring space. In addition, the new, Low-Profile SERVICENTER Assembly makes it simple to rewire and add outlets. On office renovation and restoration projects, Low-LOC access floors can eliminate the need to adjust window, ceiling and door heights and other vintage treatments. Plus, Low-LOC floors are extremely stable, preserving the feel of exceptionally solid construction you value in older buildings. Low-LOC floor systems are rigid, and once they're in place, you'll never know you're walking on an access floor.



Double-lid Low-Profile SERVICENTER assembly accommodates power/voice/data components, including the AMP Inc. INNERGY system.

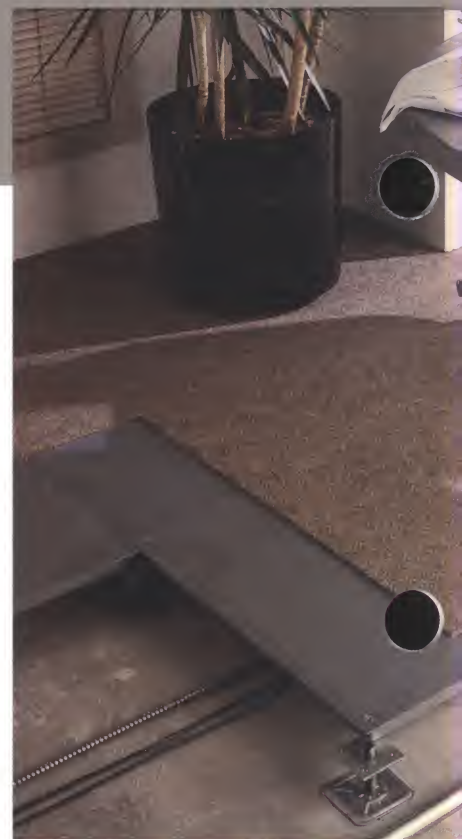
Low-LOC Understructure

Ideal for lease and rehab spaces that need modern wire management.

- Finished floor heights can be 3", 4" or 5" with adjustments of $\pm \frac{5}{8}$ ". 2 $\frac{1}{2}$ " finished floor heights are available with limitations.
- Eliminates the need to adjust window, ceiling and door heights on office renovation and restoration projects.
- Adjusts to create a completely level floor over a wide range of slab conditions.
- Mechanically fastens panels at all four corners for rigidity and lateral stability.
- Fasteners on understructure securely lock panels down for firmness and quiet comfort.

Low-LOC Panels

- Each panel is welded unitized construction and filled with lightweight cementitious core material for long-term performance.
- Cementitious fill provides structural stability and acoustical performance for quiet comfort and a solid, rigid feel underfoot.
- Panel strength offers extra resistance against top sheet deformation, even under heavy rolling loads.



Low-LOC Performance⁽¹⁾

Ultimate Load ⁽²⁾	2900 lbs.
Safety Factor	2.9
Rolling Load	600 lbs.
Concentrated Load	1000 ⁽³⁾ lbs.

(1) Panel tested in accordance with CISCA Testing Standards.

(2) Heavier duty office panels are also available.

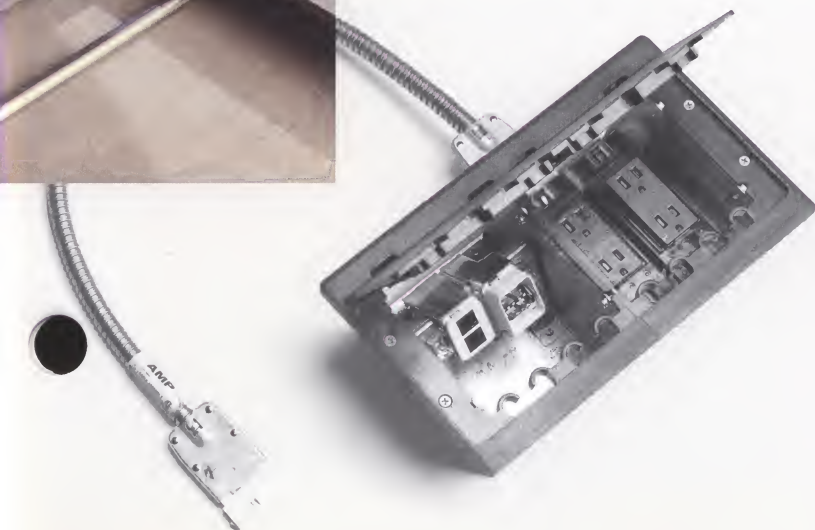
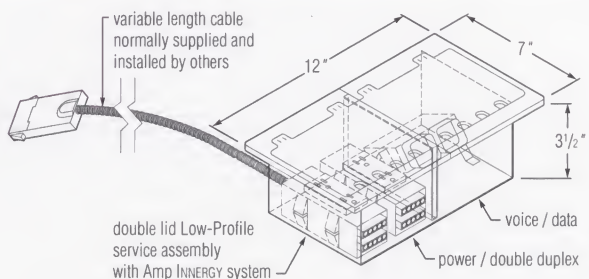
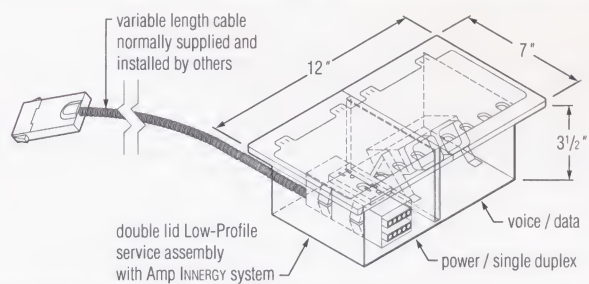
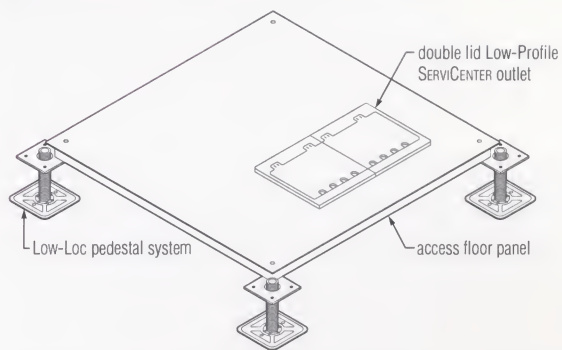
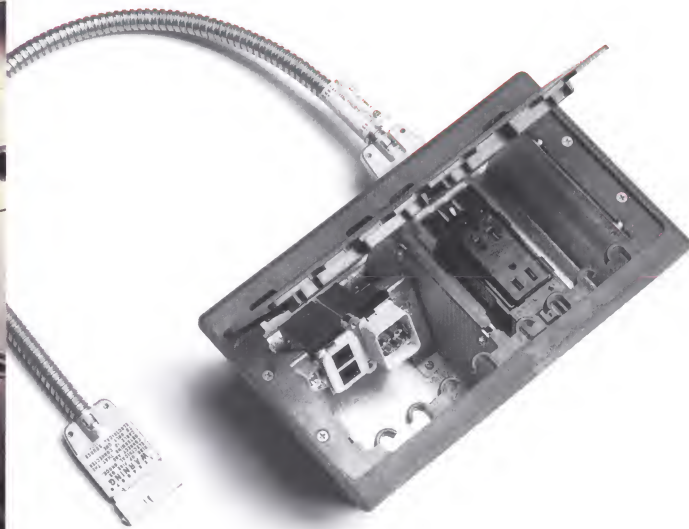
(3) Top surface deflection is 0.100 in. or less.

(4) For more information contact Technical Services at 1-800-522-3666.





Low-Loc system is ideal for lease and rehab spaces that need modern wire management.



Air Distribution Systems

The Control Plenum System from USG Interiors is engineered for modern office buildings that utilize floor-to-ceiling air distribution. The upward air movement flows in the same direction as the thermal lift produced by computers, task lighting and people. Warm and stale air is directed to ceiling returns and extracted, leaving the workspace conditions more desirable for human comfort and higher productivity. Interior and perimeter zones can be handled using a combination of Krantz KB-200 floor air diffusers and DONN Fan Control Units.

Interior Zone Krantz KB-200 Diffuser

Material—All components are high-impact polycarbonate Makrolon #94-15 manufactured by Mobay Chemical Co.

Compliance—Injection-molded, self-extinguishing material complies with UL-94 and ASTM D635 criteria.

Color—Standard: light gray. Other colors are available to match or complement carpet tile colors and patterns.

Outlets—Floor outlets feature angular slots that twist air exiting the diffuser in a radial fashion to achieve a very high induction ratio.

Air Temperature—Plenum supply air may be introduced into the room at 62–65° F for air conditioning versus 55–58° F for ceiling diffusers, making the system less costly to operate.

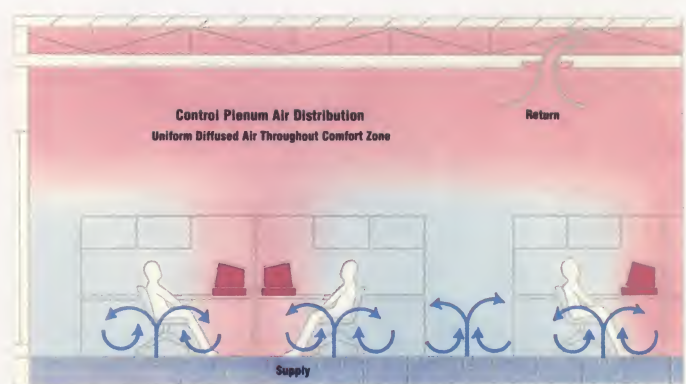
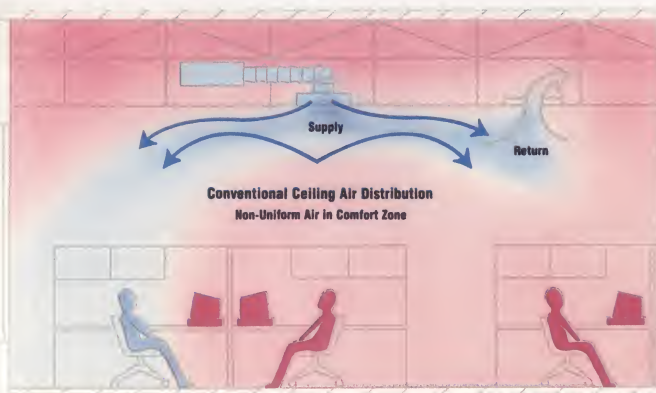
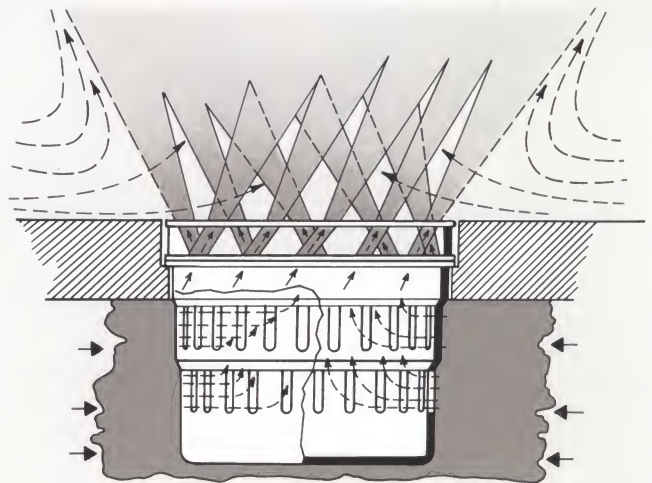
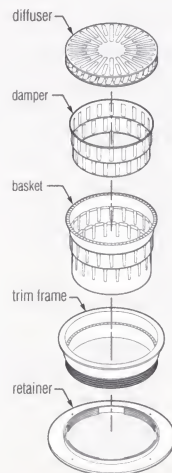
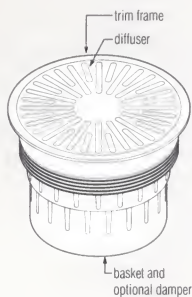
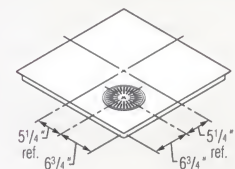
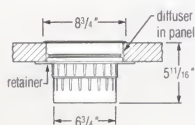
Air Flow—Air flow per KB-200 diffuser outlet can vary from 75 to 100 cfm depending on static pressure within the Control Plenum System.

Damper—An optional damper is readily installed within the basket for additional air control.

Maintenance—Assembly includes the radial angular slot diffuser together with a dirt-collecting basket that can be easily removed for cleaning.

Installation

1. Panel can be supplied with factory cutout at location shown in drawing. Field cutout size for KB-200 diffuser: $8\frac{5}{16}$ " dia. $\pm\frac{1}{32}$ ".
2. Trim frame is placed in cutout and secured to panel with retainer.
3. Panel assembly is installed in floor.
4. Basket, damper (optional) and diffuser are inserted into outlet.

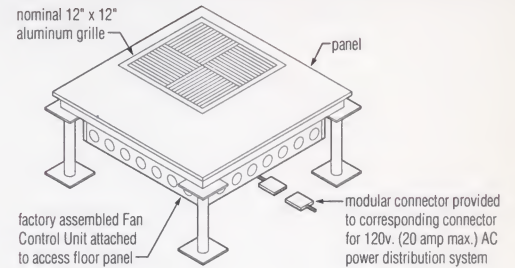


Interior Zone

DONN Fan Control Unit with Aluminum Grille 4-Way Diffuser

Application For interior zones with varying thermal conditions, such as workstations and/or conference rooms. Built-in fan speed control can be adjusted from top of panel for additional comfort control.

Aluminum Grille—12" x 12" (nominal) with four adjustable grille components for directional control.

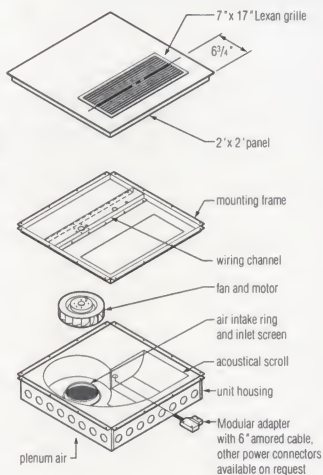
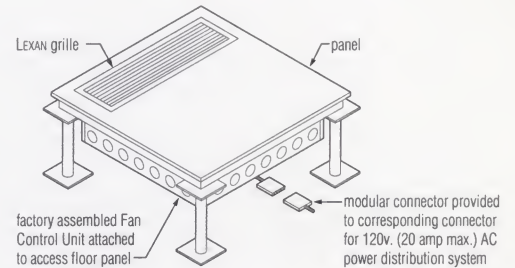


Perimeter Zone

DONN Fan Control Unit with LEXAN Grille

Application For perimeter zones having high and/or variable thermal conditions.

Air Grille—7"x17" (nominal) LEXAN® plastic linear grille. One piece, electrically nonconductive, molded construction, gray thermoplastic resin is UL fire-rated, test method 94 V-O.



Components

Housing—Galvanized steel housing is attached to underside of panel with 12 #8x 1/2" hex washer-head self-drilling screws.

Fan Assembly—45-watt, 115-volt, 1500-rpm motor powers a backward-curved impeller fan that is shielded by inlet screen. Fan assembly is secured to mounting frame.

Power Connector—Unit is provided with modular wiring adapter for ease of installation and relocation. The external adapter is connected by branch cable to 120-volt/20-amp AC power supply.

Installation

1. Fan Control Units are provided factory-installed to appropriate 24"x24" DONN access floor panels. They are shipped to jobsite as a complete assembly.
2. Keep underside of Fan Control Unit (max. 5 1/8" depth) free of any obstructions. Maintain minimum 2" vertical space between subfloor and inlet.
3. Connect factory-installed ELECTRO/CONNECT® adapter for 120-volt AC power supply to flexible wiring system. Other adapter/connectors are available.
4. Install complete assembly into access floor system.

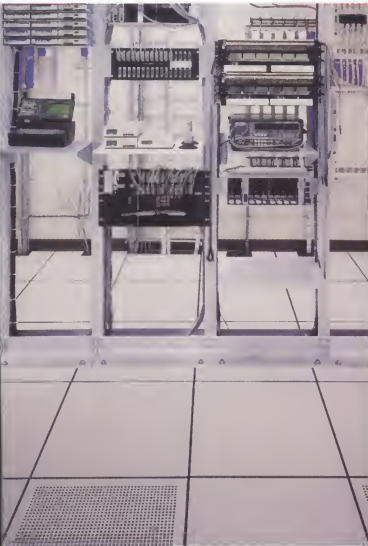
DONN access floor system with Krantz KB-200 diffuser, SERVICENTER outlet and CORNERLOC understructure.



Floor Systems for DATA CENTERS

Access floor systems provide exceptional flexibility and management control in the rapidly changing data center environment. The wide array of DONN access floors enables systems to be tailored to precise data center and computer or equipment room requirements, including placement of panels with different load characteristics exactly where they are needed within a common understructure.

Donn All-Steel system with
Tuf-Flo II panels.



DONN access floors allow repair, rearrangement and upgrading of computer equipment and services. They also control air distribution, conceal and manage cables, wires and other services. Panel and understructure systems are designed to offer strength, flexibility and accessibility.

Specific combinations of panels and understructures for systems meet stringent load requirements. The tables provided will help you select the system combinations that are right for you.

TUF-FLO II Perforated Panel

Static Pressure (Inches of H ₂ O)	.05	.075	0.1	0.15	0.2
CFM* with Damper	380	466	540	660	762
CFM* without Damper	510	625	722	885	1022

*Cubic feet per minute. ETL-certified test data.

Access Floors For Data Centers Selection Guide

Panels and understructures can be mixed and matched to meet strategic safety and load performance requirements.

System		Rated Ultimate Load (lbs.)	Rated Concen- trated Load (lbs.)	Rated Rolling Load (lbs.)	Impact Loads (lbs.)	Recommended Finished Floor Height (ft)
Panel	Understructure					
All-Steel System						
AS-1000	Edge Support Rigid Grid	3600	1000	400	100	Up to 36"
AS-1000	SNAP-LOC	3100	1000	400	100	Up to 24"
AS-1000	FreeStanding	3000	1000	400	100	Up to 18"
AS-1250	Edge Support Rigid Grid	4600	1250	500	110	Up to 36"
AS-1250	SNAP-LOC	3800	1250	500	110	Up to 24"
AS-1250	FreeStanding	3500	1250	500	110	Up to 18"
AS-1500	Edge Support Rigid Grid	6000	1500	750	120	Up to 36"
AS-1500	SNAP-LOC	4000	1500	600	120	Up to 24"
SOLIDFEEL II System						
SF-1000	Edge Support Rigid Grid	4000	1000	800	125	Up to 36"
SF-1000	SNAP-LOC	3400	1000	800	125	Up to 24"
SF-1000	FreeStanding	3300	1000	800	125	Up to 18"
SF-1250	Edge Support Rigid Grid	5000	1250	1000	150	Up to 36"
SF-1250	SNAP-LOC	3500	1250	1000	150	Up to 24"
SF-1250	FreeStanding	3400	1250	1000	150	Up to 18"
SF-1500	Edge Support Rigid Grid	5200	1500	1200	175	Up to 36"
SF-1500	SNAP-LOC	4000	1500	1200	175	Up to 24"
SF-2000	Edge Support Rigid Grid	7500	2000	2000	200	Up to 36"

Rated system loads shown are recommended by USG Interiors and tested in accordance with CISCA Testing Standard.

†For higher finished floor heights, contact Technical Services at 1-800-522-3666.



All-Steel Access Floors

Economical high performance and strength

- Welded unitized steel construction offers ultimate in load resistance and efficient load dispersal.

Easy installation and maintenance

- Lighter weight makes All-Steel panels easy to install and reconfigure to keep up with changing equipment and space requirements.
- Durable steel construction makes panels easy to cut without dust. Ideal for cable cutouts.
- Durable, conductive epoxy paint finish resists abrasion and dissipates static electricity.
- Maintenance free.

Tailored appearance

- Available with patented Designer Integral Trim or UNI-TRIM on DONN HPL. Static Conductive HPL is also available. Integral Trim is machined from the DONN HPL panel surface for a stronger and more permanent edge. Integral Trim won't crack, chip or fall off. Its finer module line is half the width of add-on trim for improved visual appeal.
- Carpet coverings factory-laminated to panels are ideal for data centers in support of computer machine rooms.

System flexibility

- Meets a wide variety of architectural and mechanical requirements.
- Interchangeable with SOLIDFEEL II panels and TUF-FLO panels which provide high capacity airflow. TUF-FLO panels have 25% open area for maximum air flow and low noise. (Check variations in panel height and thickness of floor coverings.) Optional galvanized damper allows adjustment from top of panel.
- TUF-FLO panels are not recommended for heavy rolling load areas.

SOLIDFEEL II Access Floors

Exceptional performance

- Combines ultimate load strength of a formed steel panel and a cementitious core.
- Continuous steel drawn corners are superior to folded corners.
- HPL with Integral Trim won't chip, crack or fall off like add-on trim.

Quiet comfort and rigid feel underfoot

- Lightweight core material improves acoustical performance and rolling load strength. Superior to heavy concrete panels.
- Lighter than heavy concrete panels.

High safety factor and value

- Exceptional panel and core strength protect against hazardous failure.
- Unitized construction maximizes strength for high traffic and heavy rolling loads.
- Will not crack under high ultimate loads.
- Conductive epoxy paint dissipates static electricity.

Easy maintenance and modification

- Lighter weight makes panels easier to remove during routine maintenance and equipment and layout changes. Easily accommodates frequent moves.
- Interchangeable with All-Steel panels and TUF-FLO II panels for cable cut-outs and high-capacity air flow. (Check variations in panel height and thickness of floor coverings.)



High-tech data center features
All-Steel panels and CORNERLOC
Understructure.

WOOD-COR Access Floors

Most economical solution to access floor requirements of computer rooms

- Steel-encased particleboard panel.
- Excellent sound qualities for user comfort.
- Meets Class A fire rating per ASTM E84.
- Recommended for normal load requirements.

Steel and wood particleboard construction

- Galvanized steel completely encases the wood particleboard core for improved load performance.
- Available with Static Control DONN HPL, conductive HPL and vinyl coverings.
- Edge trim is mechanically locked to panel edges and fitted at corners.

Interchangeable with Perforated Air Panel

- Perforated air panel has 25% open area for maximum airflow and low noise levels. Optional galvanized damper allows easy adjustment of airflow from top of panel.
- Perforated panels are not recommended for heavy rolling load areas.

Mark 30 Access Floors

The traditional choice for computer room access floor panels

- Mark 30 panels offer strong, lightweight, all steel construction in a unique radial rib design.
- Edge trim for 1/8" HPL is mechanically locked to panel edges and fitted at the corners.
- Durable, conductive epoxy paint finish resists abrasion and dissipates static electricity.

Interchangeable components

- Mark 30 perforated panel provides airflow. Optional galvanized damper allows easy adjustment of airflow from top of panel. Perforated panel has 1,000 lb. concentrated load rating.
- Perforated panels are not recommended for heavy rolling load areas.



Access Floors For Data Centers Selection Guide

Panels and understructures can be mixed and matched to meet strategic safety and load performance requirements.

System		Rated Rolling Load (lbs.)	Rated Concen- trated Load (lbs.)	Rated Ultimate Load (lbs.)	Impact Loads (lbs.)	Recommended Finished Floor Height ⁽¹⁾
Wood-Cor System						
WC-1000	Rigid Grid	800	1000	2800	120	Up to 36"
WC-1000	SNAP-LOC	600	1000	2200	120	Up to 24"
WC-1000	FreeStanding	600	1000	2000	120	Up to 18"
Mark 30 System						
MK-1250	Rigid Grid	500	1250	2500	120	Up to 36"
MK-1250	SNAP-LOC	500	1250	2500	120	Up to 24"
MK-1500	Rigid Grid	600	1500	3000	120	Up to 36"
MK-1500	SNAP-LOC	600	1500	3000	120	Up to 24"

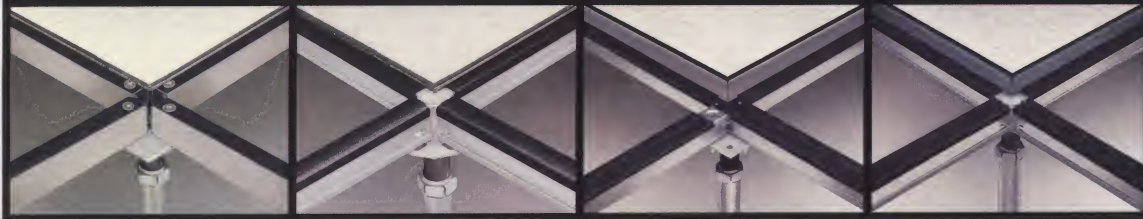
Rated system loads shown are recommended by USG Interiors and tested in accordance with CISCA Testing Standards.

†For higher finished floor heights, contact Technical Services at 1-800-522-3666.

WOOD-COR panel system with combination of Grey Matrix and Grey Kontrac static-control high-pressure laminates.



Data Center Understructures



Edge Support Rigid Grid Understructure

Withstands high lateral forces caused by intermittent starting and stopping of heavy rolling loads.

- Available in 2'x2', 2'x4', and 4'x4' basketweave configurations.
- Factory-bonded integral gasket on stringer for tighter seal and improved sound control.
- Gravity-lock collar ensures system levelness.
- Continuity connectors provide less than 10 ohms resistance between panel and understructure for safety and system conductivity.

SNAP-LOC Understructure

Recommended for less severe concentrated and rolling load applications.

- Stringers snap on and off without tools.
- Stringer covers provide improved sound control.
- Gravity-lock collar ensures system levelness.
- Continuity connectors provide less than 10 ohms resistance between panel and understructure for safety and system conductivity.

WOOD-COR Rigid Grid Understructure

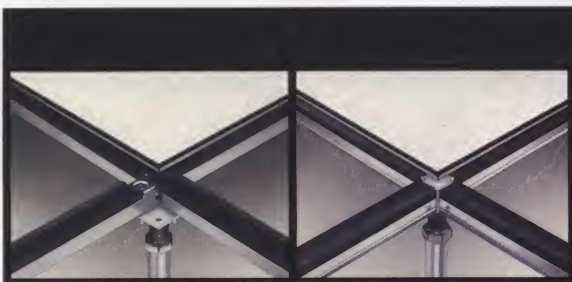
Bolted stringers of 6' and 2' lengths improve lateral stability.

- Stringers support panels along perimeter.
- Stringers are covered with conductive vinyl to provide panel alignment and sound control.
- Gravity-lock collar ensures system levelness.
- Continuity clips provide less than 10 ohms resistance between panel and understructure for safety.

WOOD-COR SNAP-LOC Understructure

Designed for less severe applications.

- Roll-formed, galvanized steel stringers come in 2' lengths with vinyl covers for sound control and panel alignment.
- Gravity-lock collar ensures system levelness.
- Spring-action connection on pedestal cap allows stringers to connect without fasteners and to be removed quickly without tools.



Mark 30 Rigid Grid Understructure

Most laterally stable understructure.

- Bolted stringers of 6' and 2' lengths improve lateral stability.
- 2' vinyl cover adds sound control and provides an air seal between the panel and stringer.
- Gravity-lock collar on Mark 30 pedestal ensures system levelness.
- Continuity clips provide less than 10 ohms resistance between panel and understructure for safety.

Mark 30 SNAP-LOC Understructure

Designed for less severe concentrated and rolling load applications.

- A spring-action connection on the die-cast aluminum pedestal cap allows stringers to be connected without fasteners and to be removed quickly without tools.
- 2' vinyl cover adds sound control and provides an air seal between the panel and stringer.
- Gravity-lock collar ensures system levelness.

Seismic Applications for Data Centers

(For use with USG Interiors panel/systems)

Understructure Pedestal Base Assembly	Seismic Zones					
	0	1	2A	2B	3	4
Edge Support Rigid Grid 1" ϕ tube 4" x 4" steel plate (Embossed)	6"-31" FFH	6"-16" FFH	6"-12" FFH	6"-9" FFH	6" FFH	—
4" x 4" x 1/8" steel plate	32"-36" FFH	17"-28" FFH	13"-26" FFH	10"-24" FFH	7"-18" FFH	6"-15" FFH

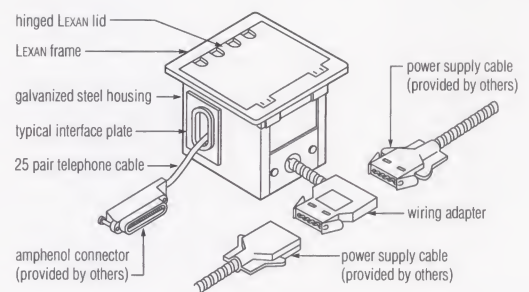
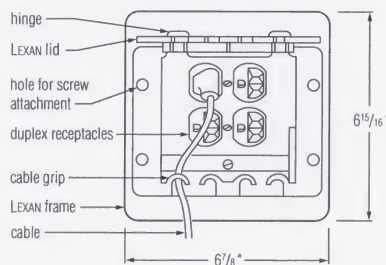
Above data based on UBC Code-1991 for computer room applications, I=1.0. For higher finished floor heights (FFH) and other understructures or code requirements, contact Technical Services at 1-800-522-3666.

Wiring Distribution Systems

SERVICENTER Outlets in the Control Plenum System provide total flexibility to handle any service required. They provide easy connection of all power, telecommunication and data services from the plenum wiring system to the workstation for user convenience. This flexibility makes it possible to install or move workstations, quickly and easily, by in-house personnel.

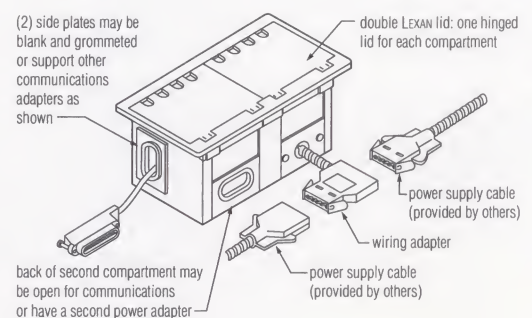
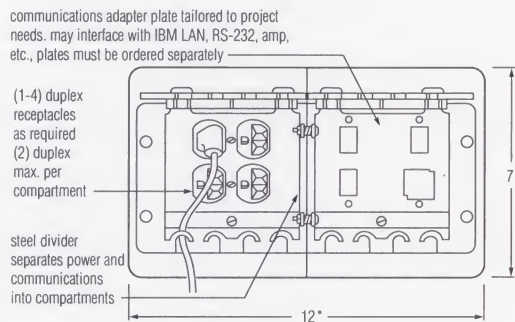
Specification Grade SERVICENTER

- Can be factory-wired with modular wiring (UL listed E 63807) or field-wired with metal-clad or armoured cable (UL listed E 75945).
- Two openings for interface plates that accommodate electrical and local area networking (LAN).
- Two 20 amp/120V duplex receptacles are standard.
- Isolated ground system capability can be customized to provide "clean power" for computers.
- 5½" overall height; accommodates 6" (min.) finished floor height (FFH).



Double Lid/Box Specification Grade SERVICENTER

- TWO compartments and lids, to separate power and communications services.
- First compartment factory-wired with modular wiring (UL listed E 63807). Modular wiring connections allow quick, easy relocation.
 - Second compartment available for telecommunications plus data connectors and cables.
 - Up to FOUR 20 amp/120V duplex receptacles may be provided using BOTH compartments for power (clean, dirty, isolated ground) systems.
 - Communications adapter plate can be tailored to specific data or telecommunications needs.
 - Isolated ground system capability can provide clean power for computers.
 - 5½" overall height; accommodates 6" (min.) finished floor height (FFH).



Note: Single lid and double lid SERVICENTER boxes are also available for lower finished floor heights.

Lid and Frame Components

- Nonconductive LEXAN construction isolates electrical parts from the work area. Lid is hinged to stay open when needed. Also can be removed if required.
- Four lid openings separate cables and reduce possibility of accidental disconnect or pinched wires. Lid openings have built-in cable grips in the frame.
- Heavy-duty construction withstands momentary concentrated loads up to 1,000 lbs.
- LEXAN frame covers edge of cut panel for added protection.
- Neutral dark finish blends with most color schemes.

Interface Connector Plates for Use with Single or Double Lid/Box SERVICENTERS

- Increase flexibility of SERVICENTER outlet: modular telephone connector plate allows SERVICENTER to be used for telephone and connector power.
- Used with Specification Grade and Commercial Grade SERVICENTER outlets.

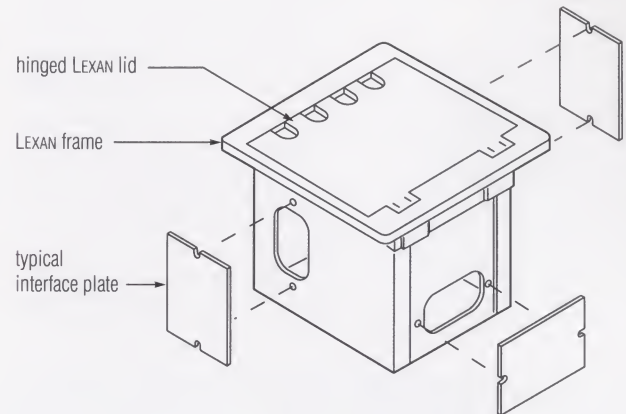


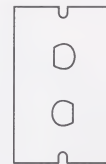
Plate with hole for 1/2" k/o power wiring.



RS-232 connector plate for fiber optic cable conversion.



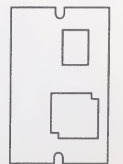
Modular telephone connector plate with RJ45 coupler (provided by others) installed in plate.



Dual coaxial LAN connector plate — 1/2" diameter/ single-D.



Plate with grommeted port.



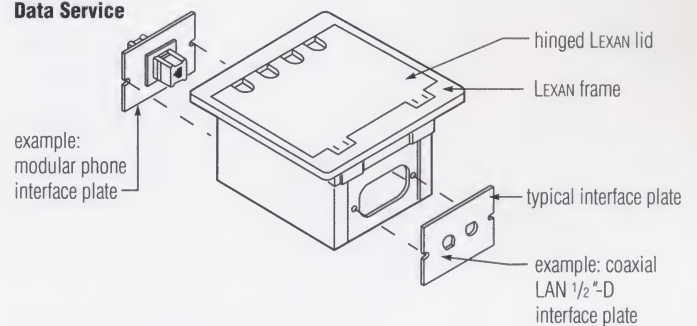
IBM-type LAN connector plate.

Commercial Grade SERVICENTER

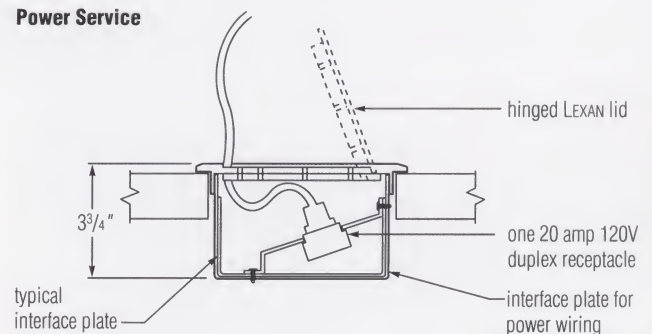
Can be used with Specification Grade SERVICENTER to separate power and communication services; can also be used as a compact box for electrical or telecommunication needs.

- Can be factory-wired with modular wiring (UL listed E 63807) or field-wired with metal-clad or armoured cable (UL listed E 75945).
- Provided with two interface plates for mounting of data cables.
- One 20 amp/120V duplex receptacle is standard.
- Accommodates 4" (min.) finished floor height (FFH).

Data Service



Power Service



Floor Covering Options

Designer Integral Trim

Static-control High Pressure Laminate (HPL) with patented Integral Trim comes in five designer color patterns.

Integral Trim is machined from the HPL itself, eliminating the need for separate pieces, to give a stronger, more permanent edge. Integral Trim won't crack, chip or fall off like add-on trim. Plus its finer module line is half the width of add-on trim, for improved visual appeal.

Integral trim HPL has the same electrical performance as DONN HPL.

DONN Static-Control

HPL Coverings

DONN HPL surfaces, in seven standard patterns, provide high wear resistance, efficient static control and attractive appearance. They meet major computer industry surface-to-ground resistance specifications (5×10^5 ohms min. to 2×10^{10} ohms max.). Two thicknesses, $\frac{1}{8}$ " and $\frac{1}{4}$ ", are available ($\frac{1}{8}$ " is recommended for most applications, offering cost savings without compromising wear, appearance or performance).

UNITRIM protective edging is sonically welded for durability.

Static-Conductive Coverings

These coverings are constructed with special built-in materials for static-conductive surfaces required in clean rooms and other high-technology areas. They meet NFPA Standard 99, which requires surface-to-ground resistance for 2.5×10^4 ohms min. to 1×10^6 ohms max. Static decay rate as measured by Federal Test Method 101, Method 4046, is .05 seconds or less.

These color reproductions show colors that are as close as possible within printing limitations to actual products. For actual production material, see HPL sample chips offered by your USG Interiors representative.

For additional technical information on laminate floor coverings, contact your USG Interiors representative or call 1-800-522-3666.

DONN HPL Patterns with Designer Integral Trim

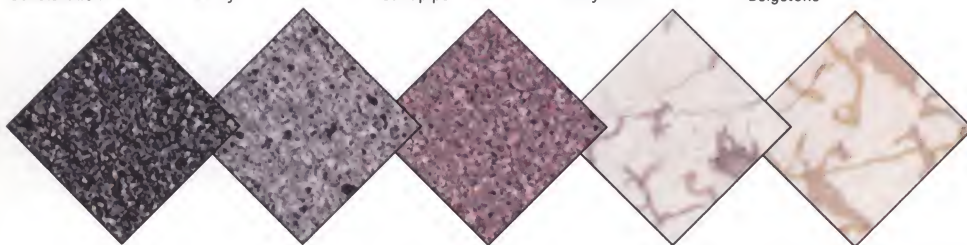
Constellation

Misty

Sandpiper

Greytone

Beigetone



DONN HPL Patterns with UNITRIM

Grey Matrix

Beige Matrix

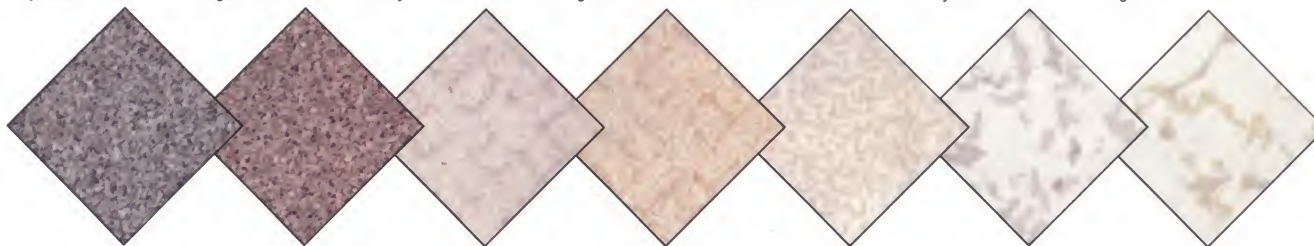
Grey Kontrac

Beige Kontrac

Whitetone

Greytone

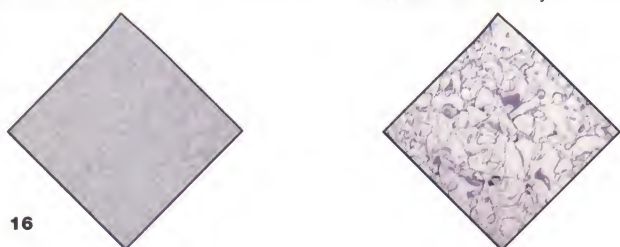
Beigetone



Conductive HPL and Conductive Vinyl Coverings

Off White HPL

Marbleized White Vinyl



Designer Integral Trim



Carpeting DONN access floor panels are offered with laminated, factory-applied carpet in two designs, multilevel or textured loop and cut pile. A urethane unitary backing on both styles prevents carpeting from unraveling at panel edges. Carpeted panels come without edge trim for a monolithic appearance.

Both carpet designs have been performance-tested for heavy-duty commercial applications. The multilevel or textured loop pile is designed for heavy wear and easy maintenance. It is ideally suited for areas subject to heavy traffic and dirt. The yarn is solution-dyed for superior color fastness in unlimited dye lot sizes.

The cut pile carpet is designed for high style and resiliency as well as easy maintenance. Both carpet designs are made of soil-hiding, advanced-generation nylon yarns. Carpeting also has passed NBS Aminco Smoke Chamber test (450 or less) and Radiant Panel Class 1 (institutional, health and commercial) at greater than 0.45 watts/cm².



Multilevel loop pile (top) and cut pile (bottom), both from J&J Industries with EDGELOC backing.

The key ingredient for data centers and control room areas is the static control and electrical performance of the total floor system. UTP factory-laminated carpets are especially designed for electronically sensitive applications. These static-dissipative COMPU-CARPET products by UTP are engineered with an exclusive conductive backing that offers optimum electrical performance. COMPU-CARPET works as a certified system with DONN access floor panels that provide a conductive electrical path from the access floor structure to building ground.

For technical information and color selections for USG-approved carpeting, contact USG Interiors Technical Services at 1-800-522-3666.

DONN ALL-STEEL and SOLIDFEEL II panel systems installed with COMPU-CARPET by UTP, below and top left, and with KRANTZ air diffusers, top left.



Durable rubber tile for high traffic areas.



Detailed specifications for your specific project are available on request. These specifications are computer generated to meet your exact needs. For technical service, call USG Interiors at 1-800-522-3666.

In addition, following are typical examples of specifications for office and computer room access floors. For offices, **ULTIMA panels with a CORNERLOC understructure are specified.** For computer rooms, **All-Steel panels with an Edge Support Rigid Grid understructure are specified.**

Part 1 General

1.01 Description of Work

- A Work in this section includes, but is not limited to: access floor panels, floor coverings, understructure and various electrical, data, communication and structural accessories.
- B Related work specified elsewhere:
 - 1 Concrete: Division 3.
 - (a) Cast-in-place concrete shall be within 1" of specified height and shall not vary more than 1/4" in 10".
 - (b) Concrete sealer if used shall be Euco Floor Coat or an approved equal that is compatible with access floor pedestal adhesive.
 - (c) Depressed slab, if specified, shall be compatible with access floor.
 - 2 Finishes: Division 9, reference paragraph 2.02B.
 - (a) Tile: Section 09300.
 - (b) Carpet: Section 09680.
 - 3 Mechanical: Division 15. Ensure compatibility of installation details with access floor.
 - 4 Electrical: Division 16. Electrical contractor shall connect access floor to building ground as specified in paragraph 3.3 C.

1.02 System Description

- A Access floor system shall consist of nominal 24" square, modular panels supported by and secured to appropriate understructure.
- B All components of the access floor system are to be of steel construction except for panel-cementitious core, surfacing materials and sound deadening pads between panel and supports.
- C Panels shall be easily removable by one person with standard tools and a lifting device and shall be interchangeable except where cut for special conditions.

- D Stringers shall be easily removable without the use of special tools. Fasteners for stringer attachment shall be accessible from the top surface of the stringer.
- E Complete floor system shall be sturdy, rigid and free of overall rocking, rattles, squeaks and noises. The finished floor shall be level within $\pm 0.100"$ and shall be level within $\pm 0.062"$ in any 10' direction.
- F Quantities, finished floor height (FFH) and location of accessories shall be as specified on the contract drawings.
- G System shall be electrically conductive for dissipation of static while having enough electrical resistance to provide protection against electrical shock.

1.03 Quality Assurance

- A Manufacturer shall have a 10-year history of successful projects of similar size and complexity. All structural access floor components shall be supplied by one manufacturer to ensure compatibility. Products shall be manufactured and identified "Made in U.S.A."
- B Contractor shall be approved by the manufacturer, use manufacturer-approved service personnel and shall have a history of five years of successful projects of similar size and complexity.
- C Method for testing concentrated, ultimate and rolling loads of access floor panels shall be in accordance with the Cisca Standard Test Procedure and shall be performed by an independent testing laboratory regularly engaged in the testing of access floor systems and components.
- D Method for testing resistance of the access floor system shall be in accordance with NFPA No. 99, Chapter 3, modified, when maintaining the room at $45\% \pm 5\%$ relative humidity.
- E Panels without covering shall have a Class A flame spread rating when tested in accordance with ASTM E 84-81a.
- F Access floor shall be capable of resisting the horizontal force (Fp) in accordance with the current Uniform Building Code standards for a(n) _____ (building type: office, computer room, hospital, school, etc.) in seismic zone _____. (Applies to seismic zones 2, 3 and 4 only. Consult your USG Interiors representative or Technical Services for recommended values.)

1.04 Sequencing/Scheduling

- A A pre-job conference to establish schedule, review shop drawings and coordinate trades must be attended by the general contractor, the access floor contractor, the mechanical contractor, the electrical contractor, and all others whose work may be affected by the access floor system.
- B Pedestal locations shall be established from approved shop drawings so that mechanical and electrical work can be installed without interfering with pedestal installation.
- C Installation of access floor shall be approved by general contractor before other trades are involved to maintain the integrity of the installed system.
- D Traffic shall not be permitted on any floor area for 24 hours to allow the pedestal adhesive to set.

1.05 Submittals

- A Manufacturer qualifications.
- B Contractor qualifications.
- C Certification that material and installation are in accordance with the specification.
- D Test reports by an independent testing laboratory certifying that component parts perform as specified.
- E One each of the following are to be submitted for review as specified: floor panel, pedestal and service outlet.
- F Shop drawings of panel layout shall include railings, steps and ramp locations with details of assembly components, anchoring methods, perimeter conditions, service boxes, cutouts, grounding methods and interfaces with other conditions.

1.06 Delivery and Placement

- A Materials shall be delivered in original, unopened packages clearly labeled with the manufacturer's name and item description.
- B Material packages shall be distributed around the areas where they will be used to avoid overstressing the subfloor and to facilitate installation.

1.07 Project Conditions

- A General contractor shall provide a dry, secure storage and a clean subfloor which is free of dust, construction debris and other trades during the installation of access floor.
- B Building shall be enclosed and the temperature shall be maintained between 40° F and 90° F.

Part 2 Products

2.01 Manufacturer

The access floor system shall consist of panels and compatible understructure designed and manufactured by USG Interiors, Inc., Access Floor Systems, Red Lion, PA.

Office Systems

2.02 Materials

- A Floor panels:
 - (1) Panels shall be welded steel components with an enclosed bottom pan formed in a uniform pattern of square pockets. The unitized panels shall be internally filled with a lightweight cementitious material to improve sound characteristics and to provide performance values as specified.
 - (2) Chipboard or particleboard material is unacceptable.
 - (3) Panels shall be protected against corrosion internally with a phosphate coating and finished with a conductive epoxy paint applied in a flow coat process.
 - (4) Panel assembly shall include four fasteners for attachment to the panel.
 - (5) Panels shall be identified with manufacturer's name, model number, load rating and "Made in U.S.A."
- B Floor covering: Panels shall be supplied bare with carpet tiles to be furnished and field-installed by others. Note: Contact your USG Interiors representative for recommendations of suitable carpet tile materials.
- C Pedestals for Seismic Zones 0, 1, and 2A:
 - For floor heights from 6" to 28":
 - (1) Pedestal assemblies shall be all-steel welded construction, corrosion resistant and capable of supporting a 5,000-lb. load without permanent deformation of any part.
 - (2) Pedestal head shall be galvanized, die-cut steel welded to a 7/8"-14 UNF threaded tube with a leveling nut and a gravity-activated metal locking collar. Pedestal head assembly shall provide vibration-proof leveling in increments of 0.012" and an overall height adjustment of 2".
 - (3) Pedestal base shall consist of a galvanized steel tube, identified as "Made in U.S.A.", with a minimum wall thickness of 0.060" welded to a 4"-square, galvanized steel base plate.

- (4) Pedestals shall be secured to subfloor with Gibson-Homans 282 or 283 adhesive or approved equal.

- (5) Pedestal assemblies adhered to unsealed concrete subfloor shall be capable, without panels in place, of resisting a 1,000 in-lb. overturning moment without failure of adhesive or any part of the pedestal.

For floor heights under 6" or higher than 28", and Seismic Zones 2B, 3 and 4, contact Technical Services.

D Accessories:

- (1) Service outlets shall be provided at locations detailed on the contract drawings. Outlets shall be UL-listed access floor boxes capable of accommodating power, signal and communications cables. The service outlet shall be a drop-in design having a hinged LEXAN lid with cable hooks and capable of supporting a 1000-lb. concentrated load.
- (2) Provide steps, ramps, handrails, fascia plate, expansion joints, perimeter ledge support, cove base and/or access holes with grommets where indicated on the contract drawings.
- (3) Provide manufacturer's standard lifting device compatible with the panel.

- E Maintenance materials: provide the following spare materials: panels, pedestals, service outlets, and panel lifting devices.

2.03 Office System

- A Structural performance: The Panel/CORNERLOC system shall perform as indicated below.

Panel System Type	Rated Ultimate Load (lbs.)	Rated Conc. Load (lbs.)	Rated Rolling Load (lbs.)	Impact Load (lbs.)
ULTIMA	2900	1000	600	100
ULTIMA HD	3500	1700	1250	175

Rated system loads shown are recommended by USG Interiors and tested in accordance with Cisca Test Standards to a deflection of 0.100".

- B Electrical resistance: Panel-to-understructure (metal-to-metal) connections shall provide less than 10 ohms resistance without grounding clips.

Data Centers

2.02 Materials

A Floor panels:

- (1) Panels shall be 24"-square, all-steel, unitized, welded construction with a minimum of 140 welds and a uniform bottom pan pattern of formed modular pockets to resist deflection anywhere on the panel.
- (2) Chipboard or particleboard material is unacceptable.
- (3) Panels shall be protected against corrosion inside and out with a conductive epoxy coating applied in an immersion dip process.
- (4) Panel trim shall be integral to the high pressure laminate (HPL). Separate trim pieces are not acceptable.
- (5) Panels shall be identified with manufacturer's name, model number, load rating and "Made in U.S.A."

- B Floor covering: Panels shall be surfaced with HPL, high wear type, grade HW 62 (0.060"), conforming to NEMA LD3-1985 standards. Note: Contact Technical Services for availability of other surface coverings.

C Pedestals for Seismic Zones 0, 1, and 2A:

For floor heights from 6" to 26":

- (1) Pedestal assemblies shall be all-steel welded construction, galvanized and capable of supporting a 5,000-lb. load without permanent deformation of any part.
- (2) Pedestal head shall be die-cut steel welded to a 1/4"-14 UNF threaded tube with a leveling nut and a gravity-activated metal locking collar. Pedestal head assembly shall provide vibration-proof leveling in increments of 0.012" and an overall vertical height adjustment of 2".
- (3) Pedestal base shall be a galvanized steel tube, identified as "Made in U.S.A.", with a minimum wall thickness of 0.060" welded to a 4"-square, galvanized steel base plate.
- (4) Pedestal assemblies adhered to subfloor, without panels or stringers in place, shall be capable of resisting a 1,000 in-lb. overturning moment without failure of adhesive or any part of the pedestal.
- (5) Pedestals shall be secured to subfloor with Gibson-Homans 282 or 283 adhesive or approved equal.

For floor heights under 6" or higher than 26", and Seismic Zones 2B, 3 and 4, contact Technical Services.

D Stringers

- (1) Stringers shall support each edge of panel.
- (2) Stringers shall be galvanized steel and capable of supporting a 450-lb. load on 1 sq. in. at the center of a 21 1/2" span with a permanent set not to exceed 0.010".
- (3) Stringers shall have integral gasket for sound deadening and plenum seal.
- (4) Stringers shall be individually and rigidly fastened to the pedestal with one 1/2" bolt for each foot of stringer length. Bolts shall provide positive electrical contact between the stringers and pedestals. Connections depending on gravity or spring action are unacceptable.
- (5) Stringer grid shall be 4' stringers in a basketweave configuration ensuring maximum lateral stability in all directions. (Also available in 2' x 4' and 2' x 2' stringer systems.)

E Accessories:

- (1) Airflow panels (with or without dampers) shall be interchangeable with solid panels and shall be provided as specified on the contract drawings. Panels shall have approximately 25% open area and deliver 540 CFM at 0.100" static pressure with damper full open (or 722 CFM at 0.100" static pressure without damper). Panels shall be capable of supporting a 1,000-lb. (or 1,250-lb.) concentrated load. Dampers, if provided, shall be adjustable from the top surface of each panel at a centrally located control.
- (2) If required, LEXAN grilles with adjustable dampers shall be provided in the locations detailed on contract drawings. Grilles shall deliver 468 CFM at 0.100" static pressure and shall be able to support a 1,000-lb. concentrated load.
- (3) Service outlets shall be provided at locations detailed on the contract drawings. Outlets shall be UL-listed access floor boxes capable of accommodating power, signal and communications cables. The service outlet shall be a drop-in design having a hinged LEXAN lid with cable hooks and capable of supporting a 1000-lb. concentrated load.

- (4) Provide steps, ramps, fascia plate and/or access holes with grommets where indicated on the contract drawings.

- (5) Provide manufacturer's standard lifting device compatible with the panel.

- F Maintenance materials: provide the following spare materials: panels, pedestals, service outlets, and panel lifting devices.

2.03 Data Center Systems

- A Structural performance: The Panel/Edge Support Rigid Grid system shall perform as indicated below.

Panel System Type	Rated Ultimate Load (lbs.)	Rated Conc. Load (lbs.)	Rated Rolling Load (lbs.)	Impact Load (lbs.)
AS-1000	3600	1000	400	100
AS-1250	4600	1250	500	110
AS-1500	6000	1500	750	120

Rated system loads shown are recommended by USG Interiors and tested in accordance with Cisca Testing Standards.

B Electrical resistance:

- (1) The resistance of the access floor system shall be between 5.0×10^5 and 2.0×10^{10} ohms measured from the floor covering to the pedestal.
- (2) Panel-to-understructure (metal-to-metal) contacts shall have not more than 10 ohms resistance. Continuity connectors shall be installed in panel.

Part 3 Execution

3.01 Inspection

- A Examine structural subfloor for unevenness, irregularities and dampness that would affect the quality and execution of the work. Do not proceed with installation until structural floor surfaces are level, clean and dry.
- B Concrete sealers, if used, shall be identified and proven to be compatible with pedestal adhesive. If other than USG Interiors recommended adhesives or sealers are used, verify that adhesive achieves bond to slab before commencing work.
- C Verify dimensions on contract drawings, including level of interfaces such as abutting floor, ledges and door sills.

3.02 Installation

- A** Pedestal locations shall be established from approved shop drawings so that mechanical and electrical work can be installed without interfering with pedestal installation.
- B** Installation of access floor shall be coordinated with other trades to maintain the integrity of the installed system. Traffic shall not be permitted on any floor area for 24 hours to allow the pedestal adhesive to set.
- C** Floor system and accessories shall be installed under the supervision of the manufacturer's authorized representative and according to manufacturer's recommendations.

- D** No dust- or debris-producing operations by other trades shall be allowed in areas where access floor is being installed to ensure proper bonding of pedestals to subfloor.
- E** Subfloor shall be kept broom clean as installation progresses.
- F** Partially complete floors shall be braced against shifting to maintain integrity of the installed system.
- G** Additional pedestals as needed shall support panels where floor is disrupted by columns, walls and cutouts.
- H** Understructure shall be aligned such that all uncut panels are interchangeable and fit snugly but do not bind when placed in alternate positions.

- I** Finished floor shall be level, not varying more than 0.062" in 10' or 0.100" overall.
- J** Installed system shall be free of vibration, rocking, rattles, squeaks and other unacceptable performance.
- K** Plenum dividers shall be accurately scribed and fit to the subfloor and sealed with mastic to ensure maintenance of plenum effect.
- L** Facia:
 - (1) Shall be accurately scribed and fit to subfloor and adjacent finished floor.
 - (2) Set in mastic and seal if required for plenum effect.
- M** Cutouts:
 - (1) Make cutouts required for services penetrating panels.
 - (2) Seal edges with grommets, plastic trim, molding and/or gaskets.
- N** Acceptance: General contractor shall accept floor in whole or part prior to allowing use by other trades.

3.03 Cleaning, Protection and Grounding After Completion of Installation—By Others

- A** Vacuum clean the entire system.
- B** Before any equipment is moved across the access floor, it shall be protected by ½" plywood.
- C** Electrical contractor shall connect the access floor to building ground per existing code.



Technical Sales and Service 1-800-522-3666



Metric Specifications—USG Corporation, through its operating subsidiaries, will provide metric conversions on its products and systems to help specifiers match metric design sizes. In addition, some products are available in metric dimensions from selected manufacturing plants. Refer to *SA-100 Construction Selector* for additional information and a Table of Metric Equivalents.

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For further information on these products, contact:

USG Interiors, Inc.
Access Floor Systems
P.O. Box 398
S. Main Street Extended
Red Lion, PA 17356
(717) 244-4071

National Showroom
The Solutions Center
USG Interiors, Inc.
222 West Hubbard
Chicago, IL 60610
(312) 822-3400

CGC Interiors
Access Floor Systems
735 Fourth Line Road
Oakville, Ont.
Canada L6L 5B7
1-800-387-7920
In Quebec, call
1-800-363-8844

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USG Interiors, Inc.
125 South Franklin Street
P.O. Box 4470
Chicago, Illinois 60680-4470

STEEL FRAMING SYSTEMS TECHNICAL INFORMATION

**STUDS
RUNNERS
JOISTS
ACCESSORIES**



**UNIMAST
INCORPORATED**

*The construction
industry's
most trusted
steel products.*

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This publication contains the latest technical information available at the time of printing on Unimast Steel Framing. Unimast reserves the right to make improvements in, or change materials and/or configurations of, any products in this literature, without prior notice or obligation. For the latest information or technical assistance, contact your local Unimast Technical Departments or Marketing Departments.



All products are precision formed from quality mill steel.



Finished product is unitized for job ready loading.



Unimast technical support is the finest available.

Unimast Incorporated is one of the nation's largest producers of construction steel products. The company manufactures, and distributes nationally, light steel framing—studs, joists and runners; drywall framing—studs, runners, corner beads, trims, control joints, resilient channels, furring channels, cold rolled channels; and plastering steel—including metal lath, corner beads, trims and accessory items.

Unimast markets most of these products under its own name. The company also is the exclusive supplier of United States Gypsum Company construction steel products. Those products include special studs and components for shaft wall and area separation wall systems as well as beads, control joints and other metal products made to United States Gypsum Company Specifications.

All Unimast products are manufactured from quality mill steel and precision formed. All products are designed to meet or exceed industry standards established by the American Society for Testing and Materials (ASTM), the American Iron and Steel Institute (AISI) and all major code authorities. For these reasons, Unimast is recognized as the manufacturer of the industry's most trusted steel products.

Unimast Service

Unimast's commitment to service sets it apart from its competitors. While other manufacturers produce construction materials, none consistently offer the reliable sales support, in-depth technical assistance and on-time delivery Unimast provides. The company's commitment to service extends to all areas of operation, including packaging for safety, color coding and labeling for inventory, special-count bundling and job-ready loading. It's what you expect from a leader. It's what you get from Unimast.

Unimast Technical Support

Unimast's technical support personnel are available to assist architects, engineers, contractors and dealers in specifying those assemblies and components that will safely and economically meet design objectives.

Technical services include answers to product application questions, development of details and framing drawings, and value engineering to ensure cost effective construction.

This manual, "Steel Framing Systems Technical Information" contains information on the framing of load-bearing systems, curtain wall systems and interior nonload-bearing partitions. Load tables and limiting height tables are for single and, in some cases, double span conditions. Products described include:

1. SJ members—used in load-bearing and curtain wall applications.
2. SN members—designed specifically to meet curtain wall construction requirements.
3. ST members—used in interior nonload-bearing applications.

Many framing systems used in construction projects are more complex, involving cantilevers, spandrels, parapets and unique details. These systems require additional analysis that is not provided within the tables but is available from Unimast's Technical Department at each location.

Section properties and steel specifications vary among manufacturers. Information provided by the Unimast Technical Departments and within Unimast's literature applies only to Unimast's steel framing. For assistance in sizing Unimast's steel framing, call the Unimast sales office nearest you.

The types of Unimast products used for particular applications depends on thickness, coating type, yield strengths, section properties, testing, specifications and standards, such as those established by the American Society for Testing and Materials (ASTM) and the American Iron and Steel Institute (AISI) and code authorities. This publication is designed to assist you in the selection of the correct product for your application.

All sizes, gauges and products may not be available from all manufacturing plants. Contact your sales representative or the Unimast sales office nearest you for information on availability.

Member Designation

Unimast's steel framing carries a three-part code that identifies the size, style and gauge. For example:

362SJ20 — Gauge: 20, 18, 16, 14

Style: SJ - stud/joist
CR - runner track

Size: 362 - 3 5/8"
40 - 4"
60 - 6"
725 - 7 1/4"
80 - 8"
925 - 9 1/4"
115 - 11 1/2"
135 - 13 1/2"

600SN18 — Gauge: 20, 18, 16, 14

Style: SN - stud

Size: 358 - 3 5/8"
400 - 4"
600 - 6"
800 - 8"

358ST25 — Gauge: 25, 22, 20

Style: ST - stud
CR - runner track

Size: 158 - 1 5/8"
212 - 2 1/2"
358 - 3 5/8"
400 - 4"
600 - 6"

SJ (3 5/8", 4")



SJ (6" to 13 1/2")



SN Stud



ST stud



CR runner



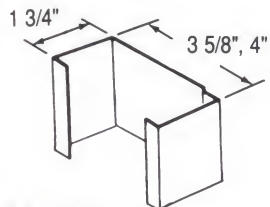
Table 1

Steel Thickness

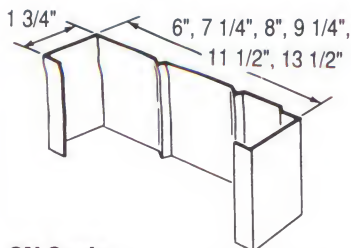
Style	Gauge	Design		Minimum		End Color Code
		in	mm	in	mm	
ST,CR25	25	.0188	.48	.0179	.45	none
ST,CR22	22	.0284	.72	.0270	.69	blue
ST,CR20	20	.0329	.84	.0312	.79	white
SN20	20	.0329	.84	.0312	.79	white
SN18	18	.0438	1.12	.0416	1.06	yellow
SN16	16	.0548	1.40	.0521	1.33	green
SN14	14	.0697	1.78	.0662	1.69	orange
SJ20	20	.0359	.91	.0341	.87	white
SJ,CR18	18	.0478	1.21	.0454	1.15	yellow
SJ,CR16	16	.0598	1.52	.0568	1.44	green
SJ,CR14	14	.0747	1.90	.0710	1.80	orange

Uncoated thickness.

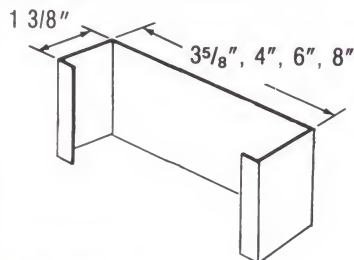
SJ Studs



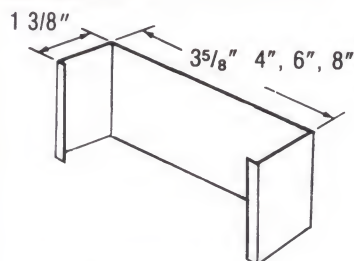
SJ Joist



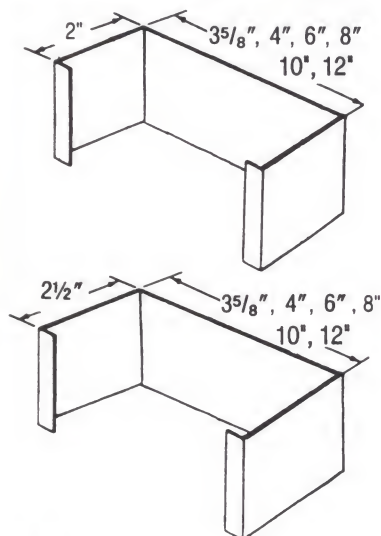
SN Studs



CW Studs



SW & SE Studs or Joists



Unimast's light steel framing is manufactured from steel (20, 18, 16 and 14-gauge) having yield strength of 40 ksi (40,000 pounds per square inch) for studs and 33 ksi for runners. Members made from 33 ksi and 50 ksi yield strength steel in various thicknesses are also available.

Coatings on light steel framing are galvanized per ASTM A525.

SJ Studs or Joists

These members are available in web depths of 3 5/8", 4", 6", 7 1/4", 8", 9 1/4", 11 1/2" and 13 1/2". Other select sizes are available on request. SJ members may be used in either load-bearing or curtain wall framing applications. The SJ member is a unique channel-type section which permits nesting. With nesting*, two members can be used to increase the structural capacity without an increase in dimension of a single member. Oval holes, or punch outs, 1 1/2" x 4", are located in the web for installation of cold-rolled channel lateral bracing. The holes also facilitate the installation of plumbing and electrical systems. SJ members are available in custom lengths up to 40'.

SN Studs

These studs are recommended for curtain wall applications only. The 1 3/8" flange is greater than that required for partition studs, adding bearing surface, but less than that required for load-bearing applications. SN studs are available in 3 5/8", 4", 6" and 8" web depths. Other depths are available on special request.

CW Studs

Designed for curtain wall applications as an economical alternative to SN studs, CW studs are available in 3 5/8", 6" and 8" depths.

SW & SE Studs or Joists

Extra load-carrying capacity for demanding joist applications. Designed similar to the SN stud, but with wider flanges. SW has a 2" flange and SE has a 2 1/2" flange. Available in 2 1/2", 3 5/8", 4", 6", 10" and 12" depths.

CR Runners

These members are channel-shaped sections used as the top and bottom tracks of stud walls and as end support closures for joists at exterior walls or foundation walls. They are available in all stud/joist sizes and gauges. Standard leg length on CR runners is 1 1/4". CR members are available in standard lengths of 10'. Special requests for other lengths depend on construction and manufacturing limitations. Call the Unimast Sales Office nearest you for allowable load information, for section and physical properties, and for availability.

Deep Leg Track

CR runners with longer leg depths, used for slip tracks in nonload-bearing construction, are available in 20, 18, 16 and 14-gauge in 10' lengths. Inside web dimension, leg length and gauge must be specified when ordering.

Foundation Clips

Clips 5 1/2" x 5" x 16-gauge and 5" in length are used to anchor header joists and CR runners to the foundation. The clip accommodates 1/2" foundation anchor bolts through a 1/2" x 3" slotted hole which allows for inaccuracies in bolt placement. Prepunched holes provide guides for attachment to joists or CR runners.

End Clips

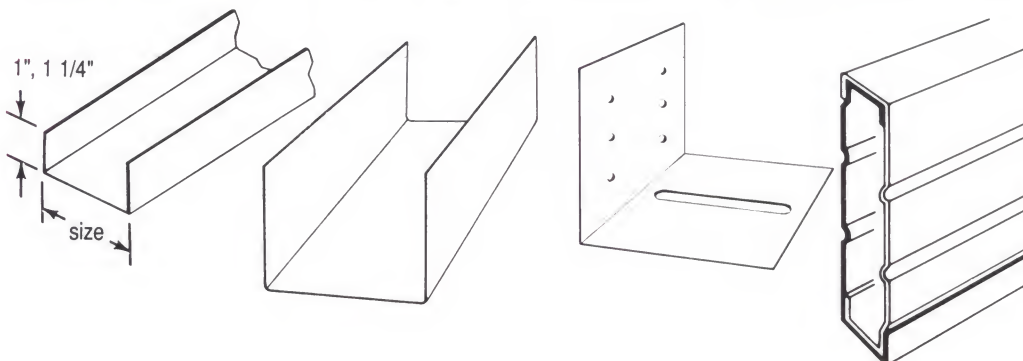
2" x 2" angles made from 14-gauge steel with prepunched holes for screw attachment are available in 6", 8" and 10" lengths.

CR runner

Deep leg track

Foundation clip

*Nested joists



Channel Clips

Standard clips used for the attachment of 1 1/2" cold-rolled channel to studs are available in two sizes: 2" x 2" x 16-gauge, 3 3/8" length and 2" x 2" x 16-gauge, 5 3/4" length. Other clips are available by special order.

Framing Clips

3" x 3" x 18-gauge clips x 3" length are available as standard clips for various framing details.

Flat Strapping

Flat steel straps are available in 20-gauge, 1 1/2" x 10' lengths for lateral bracing of studs and 18-gauge for floor bridging. Strapping is also available 18, 16 and 14-gauge in 10' lengths and in varying widths for diagonal bracing to resist racking. Strapping also may be ordered in 100' coils.

Specials

Custom made angles, straps, runners and clips are also available from Unimast. Contact your Unimast sales office for availability.

1 1/2" Cold-Rolled Channel

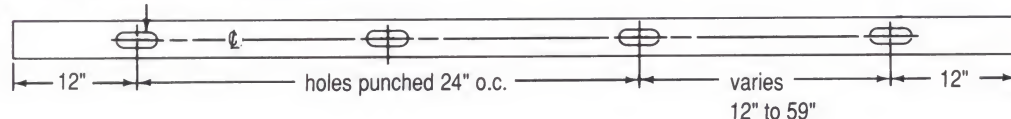
This channel is rolled formed from 16-gauge steel. Two coatings are available: galvanized or painted. Used for lateral bracing, the channel is inserted through stud punchouts and attached with welds or clip angles to the studs. It is available in 10', 16' and 20' lengths.

Web Stiffeners

Two-piece web stiffeners are used for joists and studs at points of reaction and concentrated loads to prevent web crippling. They are formed of 14 gauge steel with predrilled holes for screw attachment to webs. Web stiffeners are available in 6", 7 1/4", 8", 9 1/4", 11 1/2" and 13 1/2" sizes.

Standard hole placement (unpunched studs available on request)

1 1/2" x 4" web cutout on centerline



Drywall Framing

Unimast's drywall framing includes the studs and runners manufactured from 25, 22 and 20-gauge steel. These studs and runners are used for interior nonload-bearing applications. 20-gauge drywall studs and runners may also be used for select curtain wall applications.

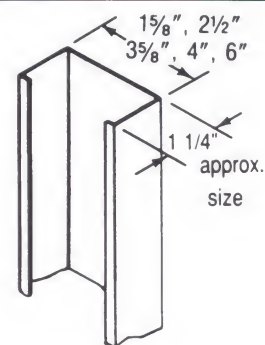
The studs are designated by ST and the runners by CR. Both are available in 1 5/8", 2 1/2", 3 5/8", 4" and 6" depths. The ST member is nestable because of a slight difference in flange lengths. When nested, two members fit together in the space of one. The ST studs have keyhole-shaped punchouts 24" o.c., except for the spacing of the top two holes which may vary. These key holes are used for convenience in installing electrical and plumbing systems and accommodate cold-rolled channel, when required.

The ST members are available in stock lengths of 8', 9', 10', 12' and 16', depending on size and gauge. Custom length studs are also available. CR runners are available in standard 10' lengths. Special requests for non-standard lengths may be met. Contact the Unimast sales office for availability.

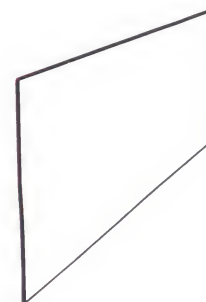
Unimast's 25, 22 and 20-gauge studs meet ASTM C645, "Standard Specification for Nonload (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board". The 25 gauge steel has a minimum thickness of 0.0179" before application of coating and the ST flanges are 1 1/4" wide. The steel thickness for all gauges of partition studs are shown in Table 1. Structural and Physical Properties are in Tables 7 and 8.

Note: See National Evaluation Service Report No. NER-211 for allowable values and/or conditions of use concerning material presented in this document. National Evaluation Reports are issued by the National Evaluation Service Committee of the Council of American Building Officials (ICBO, SBCC, BOCA) and are subject to re-examination, revisions, and possible closing.

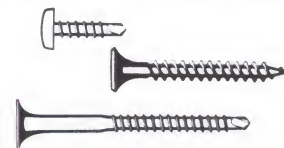
ST stud



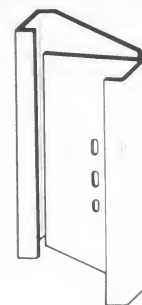
Flat strap bracing



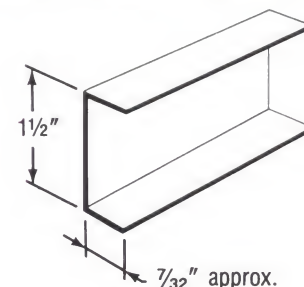
Screws

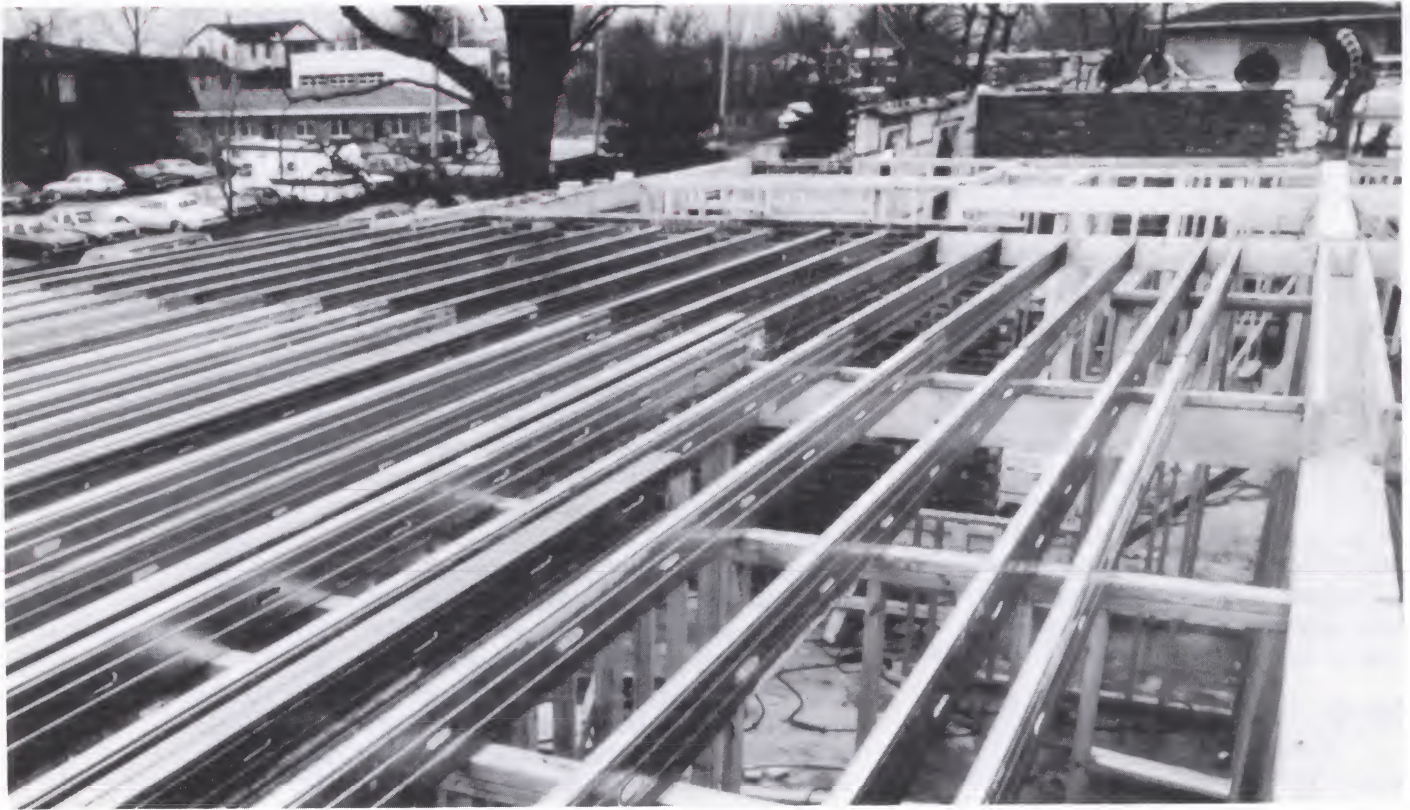


Web stiffener (2 pieces)



1 1/2" cold-rolled channel





Steel framing is excellent for residential or commercial applications.

Table 2

SJ and CR: Physical Properties

SJ									CR						
Member	Dimension (in)				t ⁽¹⁾	ANET ⁽¹⁾ (in ²)	Weight ⁽²⁾		Member	Dimension (in)			A ⁽¹⁾ (in ²)	Weight ⁽²⁾	
	A	B	C	D			(lb/ft)	(kg/m)		A	B	t ⁽¹⁾		(lb/ft)	(kg/m)
362SJ20	3.573	1.552	1.724	0.500	0.0359	0.216	0.97	1.44	362CR20	3.706	1.25	0.0329	0.199	0.696	1.04
362SJ18	3.573	1.552	1.724	0.500	0.0478	0.285	1.24	1.85	362CR18	3.729	1.25	0.0478	0.290	1.01	1.50
362SJ16	3.573	1.552	1.724	0.625	0.0598	0.368	1.59	2.37	362CR16	3.760	1.25	0.0596	0.362	1.26	1.88
362SJ14	3.573	1.552	1.724	0.625	0.0747	0.454	2.00	2.98	362CR14	3.789	1.25	0.0747	0.452	1.58	2.34
40SJ20	3.921	1.552	1.724	0.500	0.0359	0.228	1.02	1.52	40CR20	4.084	1.25	0.0329	0.211	0.734	1.10
40SJ18	3.921	1.552	1.724	0.500	0.0478	0.301	1.30	1.93	40CR18	4.105	1.25	0.0478	0.308	1.07	1.59
40SJ16	3.921	1.552	1.724	0.625	0.0598	0.388	1.67	2.48	40CR16	4.135	1.25	0.0598	0.385	1.34	1.99
40SJ14	3.921	1.552	1.724	0.625	0.0747	0.480	2.09	3.11	40CR14	4.164	1.25	0.0747	0.480	1.67	2.49
60SJ20	5.921	1.552	1.724	0.500	0.0359	0.300	1.27	1.89	60CR20	6.084	1.25	0.0329	0.277	0.969	1.44
60SJ18	5.921	1.552	1.724	0.500	0.0478	0.397	1.63	2.43	60CR18	6.105	1.25	0.0478	0.403	1.40	2.09
60SJ16	5.921	1.552	1.724	0.625	0.0598	0.508	2.08	3.10	60CR16	6.135	1.25	0.0596	0.504	1.76	2.61
60SJ14	5.921	1.552	1.724	0.625	0.0747	0.629	2.62	3.90	60CR14	6.164	1.25	0.0747	0.630	2.19	3.26
725SJ18	7.171	1.552	1.724	0.500	0.0478	0.457	1.84	2.74	725CR18	7.355	1.25	0.0478	0.463	1.61	2.39
725SJ16	7.171	1.552	1.724	0.625	0.0598	0.583	2.34	3.48	725CR16	7.385	1.25	0.0598	0.579	2.02	3.00
725SJ14	7.171	1.552	1.724	0.625	0.0747	0.720	2.95	4.39	725CR14	7.414	1.25	0.0747	0.723	2.56	3.81
80SJ18	7.921	1.552	1.724	0.500	0.0478	0.493	1.97	2.93	80CR18	8.105	1.25	0.0478	0.499	1.74	2.59
80SJ16	7.921	1.552	1.724	0.625	0.0598	0.628	2.50	3.72	80CR16	8.135	1.25	0.0598	0.624	2.17	3.23
80SJ14	7.921	1.552	1.724	0.625	0.0747	0.779	3.15	4.69	80CR14	8.164	1.25	0.0747	0.779	2.75	4.09
925SJ16	9.171	1.552	1.724	0.625	0.0598	0.702	2.76	4.11	925CR18	9.355	1.25	0.0478	0.559	1.94	2.89
925SJ14	9.171	1.552	1.724	0.625	0.0747	0.872	3.48	5.18	925CR16	9.385	1.25	0.0598	0.699	2.43	3.62
									925CR14	9.414	1.25	0.0747	0.872	3.08	4.58
115SJ16	11.421	1.552	1.724	0.625	0.0598	0.837	3.23	4.81	115CR16	11.635	1.25	0.0598	0.833	2.90	4.32
115SJ14	11.421	1.552	1.724	0.625	0.0747	1.040	4.07	6.06	115CR14	11.664	1.25	0.0747	1.040	3.86	5.48
135SJ14	13.421	1.552	1.724	0.625	0.0747	1.189	4.60	6.84	135CR14	13.664	1.25	0.0747	1.190	4.21	6.26

(1) Design thickness without coating. (2) Average shipping weight including coating.

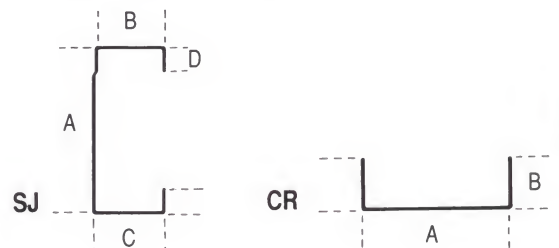


Table 3

SJ: Structural Properties⁽¹⁾

Member	t ⁽²⁾ (in)	Gross Properties							Effective Properties					Torsional Properties				
		A ⁽²⁾ (in ²)	I _x (in ⁴)	S _x (in ³)	I _y (in ⁴)	S _y (in ³)	r _x (in)	r _y (in)	AET ⁽²⁾ (in ²)	I _x ⁽³⁾ (in ⁴)	S _x (in ³)	I _y (in ⁴)	S _y ⁽⁴⁾ (in ³)	J (in ⁴)	C _w (in ⁵)	X _o (in)	j (in)	M _a (k-in)
362SJ20	0.0359	0.2697	0.551	0.302	0.104	0.088	1.429	0.621	0.2136	0.541	0.273	0.085	0.082 ^c	0.0001	0.3007	1.357	2.151	6.557
362SJ18	0.0478	0.3563	0.722	0.395	0.135	0.115	1.423	0.616	0.2713	0.708	0.385	0.111	0.106 ^c	0.0003	0.3870	1.345	2.146	9.247
362SJ16	0.0598	0.4573	0.911	0.499	0.181	0.158	1.411	0.629	0.3341	0.893	0.486	0.147	0.146 ^c	0.0005	0.5703	1.420	2.125	11.678
362SJ14	0.0747	0.5658	1.116	0.611	0.219	0.192	1.404	0.622	0.3917	1.093	0.596	0.178	0.176 ^c	0.0011	0.6833	1.406	2.118	14.293
40SJ20	0.0359	0.2822	0.683	0.341	0.107	0.089	1.556	0.617	0.1792	0.673	0.311	0.091	0.084 ^c	0.0001	0.3631	1.313	2.274	7.464
40SJ18	0.0478	0.3730	0.896	0.447	0.139	0.116	1.550	0.611	0.2576	0.882	0.437	0.117	0.108 ^c	0.0003	0.4679	1.301	2.271	10.500
40SJ16	0.0598	0.4781	1.133	0.566	0.187	0.160	1.539	0.626	0.3571	1.115	0.554	0.157	0.150 ^c	0.0006	0.6816	1.374	2.240	13.302
40SJ14	0.0747	0.5918	1.389	0.694	0.227	0.194	1.532	0.619	0.4833	1.366	0.679	0.189	0.181 ^c	0.0011	0.8176	1.359	2.234	16.300
60SJ20	0.0359	0.3540	1.798	0.597	0.122	0.094	2.253	0.587	0.2148	1.787	0.539	0.112	0.087 ^c	0.0002	0.8744	1.111	3.337	12.930
60SJ18	0.0478	0.4686	2.365	0.785	0.158	0.122	2.246	0.581	0.3107	2.350	0.773	0.145	0.118 ^c	0.0004	1.1309	1.099	3.348	18.561
60SJ16	0.0598	0.5977	3.008	0.999	0.214	0.168	2.243	0.598	0.4303	2.990	0.990	0.195	0.163 ^c	0.0007	1.5888	1.163	3.250	23.759
60SJ14	0.0747	0.7412	3.701	1.229	0.259	0.203	2.234	0.591	0.5858	3.679	1.218	0.236	0.197 ^c	0.0014	1.9148	1.148	3.261	29.231
72SJ18	0.0478	0.5284	3.746	1.029	0.167	0.124	2.663	0.562	0.2969	3.732	1.015	0.157	0.118 ^c	0.0004	1.7311	1.005	4.324	24.361
72SJ16	0.0598	0.6725	4.771	1.311	0.225	0.171	2.664	0.579	0.4304	4.753	1.303	0.211	0.166 ^c	0.0008	2.4067	1.064	4.180	31.268
72SJ14	0.0747	0.8346	5.880	1.615	0.273	0.207	2.654	0.572	0.6152	5.857	1.605	0.256	0.203 ^c	0.0015	2.9054	1.050	4.206	35.529
80SJ18	0.0478	0.5642	4.770	1.187	0.171	0.125	2.908	0.550	0.2937	4.756	1.161	0.159	0.118 ^c	0.0004	2.1644	0.956	5.020	27.874
80SJ16	0.0598	0.7173	6.078	1.513	0.231	0.172	2.911	0.568	0.4560	6.059	1.505	0.219	0.166 ^c	0.0009	2.9966	1.013	4.847	36.132
80SJ14	0.0747	0.8906	7.496	1.866	0.280	0.209	2.901	0.561	0.6936	7.473	1.856	0.265	0.205 ^c	0.0017	3.6201	0.999	4.883	44.557
92SJ16	0.0598	0.7921	8.710	1.875	0.240	0.174	3.316	0.550	0.4146	8.691	1.868	0.227	0.166 ^c	0.0009	4.1513	0.938	6.138	44.838
92SJ14	0.0747	0.9840	10.753	2.315	0.290	0.211	3.306	0.543	0.6028	10.730	2.306	0.278	0.206 ^c	0.0018	5.0200	0.925	6.193	55.351
115SJ16	0.0598	0.9266	15.046	2.606	0.251	0.177	4.030	0.521	0.4355	15.030	2.293	0.229	0.166 ^c	0.0011	6.7915	0.830	9.022	55.030
115SJ14	0.0747	1.1521	18.602	3.222	0.304	0.214	4.018	0.514	0.5366	18.580	3.214	0.292	0.207 ^c	0.0021	8.2221	0.818	9.121	77.138
135SJ14	0.0747	1.3015	28.014	4.134	0.313	0.216	4.639	0.491	0.8562	27.990	3.752	0.295	0.207 ^c	0.0024	11.8321	0.743	12.334	90.046

(1) Conforms to 1986 AISI Design Specifications; ASTM A568; ASTM C645; ASTM A446 (40ksi); ASTM A525 (hot-dipped), A792 (aluminum-zinc) or A591 (electrolytic zinc thickness equivalent to hot-dipped per A525). (2) Design thickness without coating. (3) Deflection determination. (4) Based on web in tension (t) or compression (c).

Table 4

CR: Structural Properties⁽¹⁾

Member	A ⁽²⁾ (in ²)	t ⁽²⁾ (in)	Gross Properties						Effective Properties					Torsional Properties				
			I _x (in ⁴)	S _x (in ³)	I _y (in ⁴)	S _y (in ³)	r _x (in)	r _y (in)	AE ⁽²⁾ (in ²)	I _x ⁽³⁾ (in ⁴)	S _x (in ³)	I _y (in ⁴)	S _y ⁽⁴⁾ (in ³)	J (in ⁴)	C _w (in ⁵)	X _o (in)	j (in)	M _a (k-in)
362CR20	0.199	0.0329	0.399	0.215	0.029	0.029	1.416	0.379	0.106	0.328	0.160	0.019	0.004 ^t	0.00007	0.0670	0.674	2.106	3.170
362CR18	0.290	0.0478	0.579	0.311	0.041	0.042	1.417	0.376	0.231	0.548	0.259	0.027	0.014 ^t	0.00022	0.0995	0.670	2.063	5.127
362CR16	0.362	0.0598	0.730	0.388	0.050	0.052	1.422	0.374	0.314	0.721	0.348	0.050	0.027 ^t	0.00043	0.1244	0.665	2.075	6.897
362CR14	0.452	0.0747	0.914	0.483	0.062	0.064	1.425	0.371	0.424	0.914	0.464	0.062	0.051 ^t	0.00084	0.1542	0.659	2.084	9.199
40CR20	0.211	0.0329	0.501	0.246	0.029	0.029	1.541	0.372	0.107	0.415	0.185	0.020	0.004 ^t	0.00008	0.0840	0.645	2.365	3.670
40CR18	0.308	0.0478	0.728	0.355	0.042	0.042	1.542	0.369	0.233	0.690	0.298	0.028	0.014 ^t	0.00023	0.1249	0.641	2.317	5.906
40CR16	0.385	0.0598	0.916	0.443	0.052	0.052	1.546	0.367	0.318	0.905	0.400	0.052	0.027 ^t	0.00046	0.1558	0.636	2.332	7.913
40CR14	0.480	0.0747	1.147	0.551	0.064	0.065	1.549	0.365	0.432	1.147	0.531	0.064	0.052 ^t	0.00089	0.1930	0.630	2.344	10.522
60CR20	0.277	0.0329	1.320	0.434	0.032	0.031	2.183	0.341	0.111	1.046	0.304	0.022	0.004 ^t	0.00010	0.2170	0.527	4.239	6.020
60CR18	0.403	0.0478	1.915	0.628	0.046	0.044	2.183	0.338	0.241	1.828	0.546	0.031	0.015 ^t	0.00031	0.3172	0.523	4.174	10.808
60CR16	0.504	0.0598	2.404	0.784	0.057	0.054	2.186	0.336	0.332	2.377	0.721	0.057	0.029 ^t	0.00060	0.3943	0.519	4.204	14.274
60CR14	0.630	0.0747	3.006	0.975	0.070	0.067	2.188	0.333	0.459	3.006	0.947	0.070	0.054 ^t	0.00117	0.4871	0.514	4.231	18.749
725CR18	0.463	0.0478	3.054	0.830	0.048	0.044	2.572	0.321	0.242	2.924	0.733	0.032	0.015 ^t	0.00035	0.4891	0.470	5.757	14.518
725CR16	0.579	0.0598	3.830	1.037	0.059	0.055	2.575	0.319	0.336	3.788	0.962	0.059	0.029 ^t	0.00069	0.6072	0.466	5.798	19.056
725CR14	0.723	0.0747	4.786	1.291	0.072	0.068	2.576	0.317	0.468	4.786	1.257	0.072	0.055 ^t	0.00134	0.7494	0.462	5.836	24.895
80CR18	0.499	0.0478	3.907	0.964	0.048	0.045	2.802	0.312	0.243	3.749	0.858	0.032	0.015 ^t	0.00038	0.6121	0.443	6.862	16.982
80CR16	0.624	0.0598	4.898	1.204	0.060	0.056	2.805	0.310	0.338	4.843	1.122	0.060	0.029 ^t	0.00074	0.7595	0.440	6.909	22.222
80CR14	0.779	0.0747	6.120	1.500	0.074	0.069	2.806	0.308	0.471	6.119	1.462	0.074	0.055 ^t	0.00145	0.9368	0.435	6.954	28.953
925CR18	0.559	0.0478	5.644	1.207	0.050	0.045	3.182	0.298	0.245	5.743	0.955	0.033	0.015 ^t	0.00042	0.8508	0.405	8.960	18.907
925CR16	0.699	0.0598	7.074	1.507	0.061	0.056	3.185	0.296	0.341	6.998	1.414	0.060	0.030 ^t	0.00083	1.0550	0.401	9.020	27.994
925CR14	0.872	0.0747	8.836	1.877	0.075	0.069	3.186	0.294	0.477	8.836	1.835	0.075	0.056 ^t	0.00161	1.3004	0.069	9.077	36.333
115CR16	0.833	0.0598	12.402	2.132	0.063	0.057	3.861	0.275	0.344	12.349	1.816	0.061	0.030 ^t	0.00010	1.7207	0.348	13.629	35.953
115CR14	1.040	0.0747	15.488	2.656	0.078	0.070	3.862	0.273	0.483	15.488	2.604	0.077	0.056 ^t	0.00193	2.1193	0.344	13.705	51.559
135CR14	1.190	0.0747	23.595	3.454	0.079	0.071	4.456	0.258	0.487	23.594	3.323	0.077	0.057 ^t	0.00221	3.0276	0.071	18.694	65.803

(1) Conforms to 1986 AISI Design Specifications; ASTM A568; ASTM C645; ASTM A446 (33ksi); ASTM A525 (hot-dipped), A792 (aluminum-zinc) or A591 (electrolytic zinc thickness equivalent to hot-dipped per A525). (2) Design thickness without coating. (3) Deflection determination. (4) Based on web in tension (t) or compression (c).

A full unreduced gross cross sectional area away from the hole
 ANET full cross sectional area at hole
 AET effective cross sectional area based on stub column test
 AE effective cross sectional area based on 1986 AISI
 t design thickness (uncoated)
 I_x, I_y moment of inertia of the gross section; and the effective section about the principal axis
 S_x, S_y section modulus of the gross section; and the effective section at yield about the principal axis
 r_x, r_y radius of gyration of the gross cross section away from the hole
 J St. Venant torsion constant
 C_w torsional-warping constant of the cross section
 X_o distance between center of gravity of gross cross section and shear center along the x-x axis
 j section property for torsional-flexural buckling
 M_a allowable bending moment about the x-x axis

SJ

CR





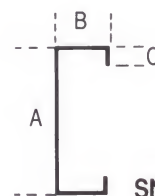
SJ studs are used in both load-bearing and curtain wall applications.

Table 5

SN: Physical Properties

Member	Dimension			t ⁽¹⁾ (in)	ANET ⁽¹⁾ (in ²)	Weight ⁽²⁾	
	A	B	C			lb/ft	kg/m
358SN20	3.573	1.375	0.438	0.0329	0.177	0.77	1.15
358SN18	3.573	1.375	0.438	0.0438	0.233	1.02	1.52
358SN16	3.573	1.375	0.375	0.0548	0.282	1.24	1.85
358SN14	3.573	1.375	0.375	0.0697	0.354	1.56	2.32
600SN20	5.921	1.375	0.438	0.0329	0.254	1.03	1.54
600SN18	5.921	1.375	0.438	0.0438	0.336	1.37	2.04
600SN16	5.921	1.375	0.375	0.0548	0.411	1.63	2.50
600SN14	5.921	1.375	0.375	0.0697	0.517	2.11	3.15
800SN18	7.921	1.375	0.438	0.0438	0.424	1.44	2.15
800SN16	7.921	1.375	0.375	0.0548	0.520	2.05	3.05
800SN14	7.921	1.375	0.375	0.0697	0.657	2.59	3.86

(1) Design thickness without coating. (2) Average shipping weight excluding coating.



SN physical properties



SN structural properties

Table 6

SN: Structural Properties⁽¹⁾

Member	t ⁽²⁾ (in)	Gross Properties							Effective Properties				Torsional Properties				Ma (k-in)
		A ⁽²⁾ (in ²)	I _x (in ⁴)	S _x (in ³)	I _y (in ⁴)	S _y (in ³)	r _x (in)	r _y (in)	I _x ⁽³⁾ (in ⁴)	S _x (in ³)	I _y (in ⁴)	S _y (in ³)	J (in ⁴)	C _w (in ⁵)	X _o (in)	j (in)	
358SN20	0.0329	0.2263	0.446	0.246	0.060	0.063	1.404	0.513	0.446	0.245	0.049	0.059	0.00008	0.1663	1.080	2.033	5.332
358SN18	0.0438	0.2989	0.585	0.323	0.077	0.081	1.400	0.508	0.585	0.320	0.063	0.076	0.00019	0.2138	1.069	2.032	7.138
358SN16	0.0548	0.3641	0.707	0.390	0.088	0.099	1.393	0.491	0.707	0.387	0.072	0.084	0.00036	0.2319	1.015	2.056	8.806
358SN14	0.0697	0.4582	0.879	0.485	0.107	0.121	1.385	0.483	0.879	0.481	0.088	0.103	0.00074	0.2807	1.000	2.058	11.240
600SN20	0.0329	0.3035	1.478	0.493	0.069	0.066	2.207	0.477	1.477	0.496	0.053	0.060	0.00011	0.4958	0.868	3.551	10.795
600SN18	0.0438	0.4017	1.944	0.648	0.089	0.085	2.200	0.472	1.944	0.652	0.076	0.081	0.00026	0.6403	0.858	3.572	14.537
600SN16	0.0548	0.4928	2.358	0.786	0.101	0.103	2.187	0.454	2.357	0.791	0.094	0.093	0.00049	0.7141	0.812	3.689	18.008
600SN14	0.0697	0.6218	2.948	0.983	0.124	0.127	2.178	0.446	2.948	0.989	0.114	0.113	0.00100	0.8698	0.798	3.726	23.120
800SN18	0.0438	0.4893	3.965	0.991	0.096	0.087	2.847	0.443	3.964	0.998	0.077	0.081	0.00031	1.2332	0.738	5.659	22.231
800SN16	0.0548	0.6024	4.823	1.206	0.108	0.106	2.829	0.424	4.821	1.213	0.096	0.093	0.00060	1.3870	0.697	5.881	27.621
800SN14	0.0697	0.7612	6.046	1.512	0.132	0.129	2.818	0.417	6.044	1.521	0.125	0.116	0.00123	1.6935	0.684	5.964	35.559

(1) Conforms to 1986 AISI Design Specifications; ASTM A568; ASTM C645; ASTM A446 (33 ksi); ASTM A525 (hot-dipped), A792 (aluminum-zinc) or A591 (electrolytic zinc thickness equivalent to hot dipped per A525). (2) Design thickness without coating. (3) Deflection determination.

Table 7

CW: Structural Properties⁽¹⁾

Member	t ⁽²⁾ (in)	Gross Properties							Effective Properties					Torsional Properties				Ma (k-in)
		A ⁽²⁾ (in ²)	I _x (in ⁴)	S _x (in ³)	I _y (in ⁴)	S _y (in ³)	r _x (in)	r _y (in)	AE ⁽²⁾ (in ²)	I _x ⁽³⁾ (in ⁴)	S _x (in ³)	I _y (in ⁴)	S _y (in ³)	J (in ⁴)	C _w (in ⁶)	X _o (in)	j (in)	
358CW20	0.0329	0.2140	0.421	0.235	0.048	0.048	1.402	0.475	0.113	0.381	0.201	0.043	0.048	0.0001	0.113	0.915	1.974	3.986
358CW18	0.0438	0.2826	0.551	0.308	0.062	0.062	1.396	0.469	0.184	0.537	0.298	0.060	0.062	0.0002	0.145	0.902	1.968	5.858
358CW16	0.0548	0.3506	0.677	0.379	0.075	0.075	1.390	0.463	0.246	0.667	0.369	0.075	0.075	0.0004	0.173	0.889	1.962	7.311
358CW14	0.0697	0.4409	0.841	0.471	0.091	0.091	1.381	0.455	0.336	0.842	0.471	0.092	0.091	0.0007	0.208	0.871	1.954	9.331
600CW20	0.0329	0.2912	1.394	0.471	0.055	0.050	2.188	0.436	0.117	1.248	0.395	0.045	0.050	0.0001	0.360	0.730	3.569	7.826
600CW18	0.0438	0.3854	1.832	0.619	0.071	0.065	2.180	0.430	0.192	1.791	0.597	0.064	0.065	0.0002	0.462	0.718	3.581	11.826
600CW16	0.0548	0.4793	2.263	0.764	0.086	0.079	2.173	0.424	0.262	2.230	0.747	0.083	0.079	0.0005	0.556	0.707	3.593	14.793
600CW14	0.0697	0.6045	2.827	0.955	0.105	0.096	2.162	0.416	0.370	2.828	0.955	0.105	0.096	0.0010	0.672	0.691	3.610	18.913
800CW18	0.0438	0.4730	3.751	0.947	0.078	0.066	2.816	0.401	0.194	3.640	0.903	0.065	0.066	0.0003	0.905	0.615	5.719	17.875
800CW16	0.0548	0.5889	4.641	1.172	0.092	0.080	2.807	0.395	0.266	4.581	1.149	0.085	0.081	0.0006	1.092	0.604	5.754	22.743
800CW14	0.0697	0.7439	5.815	1.468	0.112	0.098	2.796	0.387	0.379	5.816	1.469	0.109	0.098	0.0012	1.321	0.590	5.803	29.078

(1) Conforms to 1986 AISI Design Specifications; ASTM A568; ASTM C645; ASTM A446 (33ksi); ASTM A525 (hot dipped), A792 (aluminum-zinc) or A591 (electrolytic zinc thickness equivalent to hot-dipped per A525). (2) Design thickness without coating. (3) Deflection determination.

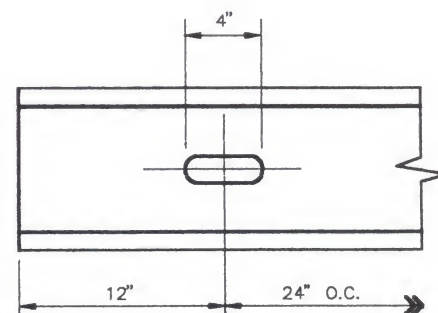
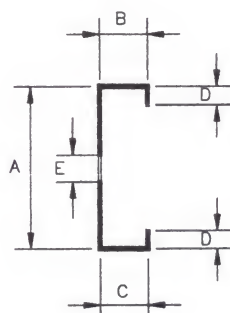
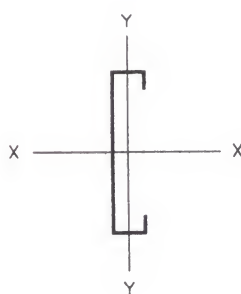


Table 8

CW: Physical Properties⁽¹⁾

Member	Dimension (in)				
	A	B	C	D	E
358CW20	3.573	1.375	1.375	0.250	1.50
358CW18	3.573	1.375	1.375	0.250	1.50
358CW16	3.573	1.375	1.375	0.250	1.50
358CW14	3.573	1.375	1.375	0.250	1.50
600CW20	5.921	1.375	1.375	0.250	1.50
600CW18	5.921	1.375	1.375	0.250	1.50
600CW16	5.921	1.375	1.375	0.250	1.50
600CW14	5.921	1.375	1.375	0.250	1.50
800CW18	7.921	1.375	1.375	0.250	1.50
800CW16	7.921	1.375	1.375	0.250	1.50
800CW14	7.921	1.375	1.375	0.250	1.50

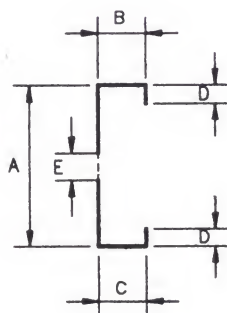


Table 9

SW: Physical Properties

Member	Dimension (in)				
	A	B	C	D	E
25SW22	2.500	2.000	2.000	0.500	0.00
25SW20	2.500	2.000	2.000	0.500	0.00
25SW18	2.500	2.000	2.000	0.500	0.00
25SW16	2.500	2.000	2.000	0.500	0.00
25SW14	2.500	2.000	2.000	0.625	0.00
362SW22	3.625	2.000	2.000	0.500	1.50
362SW20	3.625	2.000	2.000	0.500	1.50
362SW18	3.625	2.000	2.000	0.500	1.50
362SW16	3.625	2.000	2.000	0.500	1.50
362SW14	3.625	2.000	2.000	0.625	1.50
362SW12	3.625	2.000	2.000	0.625	1.50
40SW22	4.000	2.000	2.000	0.500	1.50
40SW20	4.000	2.000	2.000	0.500	1.50
40SW18	4.000	2.000	2.000	0.500	1.50
40SW16	4.000	2.000	2.000	0.500	1.50
40SW14	4.000	2.000	2.000	0.625	1.50
40SW12	4.000	2.000	2.000	0.625	1.50
60SW22	6.000	2.000	2.000	0.500	1.50
60SW20	6.000	2.000	2.000	0.500	1.50
60SW18	6.000	2.000	2.000	0.500	1.50
60SW16	6.000	2.000	2.000	0.500	1.50
60SW14	6.000	2.000	2.000	0.625	1.50
60SW12	6.000	2.000	2.000	0.625	1.50
80SW18	8.000	2.000	2.000	0.500	1.50
80SW16	8.000	2.000	2.000	0.500	1.50
80SW14	8.000	2.000	2.000	0.625	1.50
80SW12	8.000	2.000	2.000	0.625	1.50
925SW18	9.250	2.000	2.000	0.500	1.50
925SW16	9.250	2.000	2.000	0.500	1.50
925SW14	9.250	2.000	2.000	0.625	1.50
100SW16	10.000	2.000	2.000	0.500	0.00
100SW14	10.000	2.000	2.000	0.625	0.00
100SW12	10.000	2.000	2.000	0.625	0.00
120SW18	12.000	2.000	2.000	0.500	0.00
120SW16	12.000	2.000	2.000	0.500	0.00
120SW14	12.000	2.000	2.000	0.625	0.00
120SW12	12.000	2.000	2.000	0.625	0.00
135SW14	13.500	2.000	2.000	0.625	0.00
135SW12	13.500	2.000	2.000	0.625	0.00

Table 10

SW: Structural Properties⁽¹⁾

Member	t ⁽²⁾ (in)	Gross Properties							Effective Properties					Torsional Properties				
		A ⁽²⁾ (in ²)	I _x (in ⁴)	S _x (in ³)	I _y (in ⁴)	S _y (in ³)	r _x (in)	r _y (in)	A _E ⁽²⁾ (in ²)	I _x ⁽³⁾ (in ⁴)	S _x (in ³)	I _y (in ⁴)	S _y (in ³)	J (in ⁴)	C _w (in ⁶)	X _o (in)	j (in)	M _a (k-in)
25SW22	0.0299	0.2152	0.238	0.190	0.123	0.102	1.051	0.757	0.155	0.216	0.161	0.110	0.098	0.0001	0.198	1.833	2.139	3.199
25SW20	0.0359	0.2573	0.283	0.226	0.146	0.121	1.049	0.754	0.202	0.261	0.196	0.137	0.118	0.0001	0.233	1.826	2.132	3.899
25SW18	0.0478	0.3398	0.370	0.296	0.190	0.158	1.043	0.749	0.296	0.352	0.271	0.190	0.158	0.0003	0.298	1.811	2.118	5.360
25SW16	0.0598	0.4216	0.454	0.363	0.233	0.193	1.038	0.743	0.405	0.449	0.355	0.233	0.193	0.0005	0.359	1.796	2.100	7.039
25SW14	0.0747	0.5399	0.563	0.450	0.307	0.263	1.021	0.754	0.540	0.563	0.450	0.307	0.263	0.0010	0.555	1.878	2.130	8.927
362SW22	0.0299	0.2488	0.549	0.303	0.141	0.108	1.485	0.753	0.141	0.502	0.261	0.113	0.099	0.0001	0.401	1.651	2.325	5.178
362SW20	0.0359	0.2977	0.654	0.361	0.167	0.128	1.483	0.750	0.184	0.605	0.317	0.143	0.120	0.0001	0.474	1.644	2.319	6.272
362SW18	0.0478	0.3936	0.858	0.474	0.218	0.166	1.477	0.744	0.268	0.815	0.433	0.205	0.162	0.0003	0.610	1.629	2.307	8.575
362SW16	0.0598	0.4889	1.058	0.584	0.267	0.203	1.471	0.738	0.371	1.044	0.569	0.265	0.203	0.0006	0.738	1.615	2.295	11.268
362SW14	0.0747	0.6240	1.326	0.732	0.353	0.277	1.458	0.752	0.512	1.327	0.732	0.354	0.278	0.0012	1.075	1.692	2.296	14.497
362SW12	0.1046	0.8585	1.790	0.987	0.468	0.367	1.444	0.738	0.702	1.790	0.988	0.468	0.367	0.0031	1.388	1.656	2.265	19.569
40SW22	0.0299	0.2600	0.687	0.343	0.146	0.109	1.625	0.749	0.142	0.629	0.298	0.114	0.099	0.0001	0.490	1.599	2.422	5.896
40SW20	0.0359	0.3111	0.819	0.409	0.173	0.129	1.622	0.746	0.185	0.758	0.360	0.144	0.121	0.0001	0.579	1.592	2.417	7.134
40SW18	0.0478	0.4115	1.075	0.537	0.226	0.168	1.616	0.740	0.271	1.021	0.492	0.207	0.163	0.0003	0.747	1.578	2.406	9.740
40SW16	0.0598	0.5113	1.326	0.663	0.276	0.206	1.610	0.735	0.377	1.307	0.646	0.270	0.204	0.0006	0.905	1.563	2.394	12.791
40SW14	0.0747	0.6520	1.666	0.833	0.366	0.281	1.598	0.749	0.527	1.666	0.833	0.366	0.281	0.0012	1.302	1.638	2.387	16.500
40SW12	0.1046	0.8978	2.252	1.126	0.485	0.372	1.584	0.735	0.741	2.252	1.127	0.485	0.372	0.0033	1.685	1.602	2.358	22.317
60SW22	0.0299	0.3198	1.749	0.583	0.166	0.114	2.339	0.721	0.144	1.551	0.476	0.116	0.100	0.0001	1.165	1.375	3.230	9.432
60SW20	0.0359	0.3829	2.088	0.696	0.197	0.135	2.335	0.718	0.188	1.945	0.621	0.148	0.122	0.0002	1.379	1.369	3.228	12.296
60SW18	0.0478	0.5071	2.749	0.916	0.257	0.176	2.328	0.712	0.278	2.615	0.844	0.216	0.166	0.0004	1.785	1.355	3.224	16.723
60SW16	0.0598	0.6309	3.401	1.134	0.314	0.215	2.322	0.706	0.391	3.349	1.104	0.286	0.209	0.0008	2.171	1.341	3.219	21.870
60SW14	0.0747	0.8014	4.299	1.433	0.419	0.294	2.316	0.723	0.556	4.299	1.433	0.402	0.290	0.0015	3.019	1.407	3.163	28.382
60SW12	0.1046	1.1070	5.853	1.951	0.555	0.390	2.300	0.708	0.843	5.853	1.952	0.555	0.390	0.0040	3.942	1.374	3.149	38.652
80SW18	0.0478	0.6027	5.438	1.359	0.278	0.181	3.004	0.680	0.281	5.188	1.262	0.220	0.167	0.0005	3.397	1.193	4.515	24.991
80SW16	0.0598	0.7505	6.737	1.684	0.341	0.221	2.996	0.674	0.396	6.637	1.643	0.294	0.211	0.0009	4.138	1.180	4.521	32.541
80SW14	0.0747	0.9508	8.535	2.134	0.455	0.301	2.996	0.692	0.565	8.537	2.134	0.416	0.293	0.0018	5.673	1.239	4.410	42.257
80SW12	0.1046	1.3162	11.668	2.917	0.603	0.400	2.978	0.677	0.871	11.673	2.918	0.603	0.401	0.0048	7.444	1.208	4.420	57.779
925SW18	0.0478	0.6624	7.718	1.669	0.289	0.183	3.413	0.660	0.282	7.084	1.446	0.222	0.167	0.0005	4.719	1.111	5.558	28.624
925SW16	0.0598	0.8253	9.570	2.069	0.353	0.223	3.405	0.654	0.398	9.430	2.021	0.297	0.211	0.0010	5.753	1.099	5.571	40.017
925SW14	0.0747	1.0442	12.129	2.623	0.472	0.305	3.408	0.673	0.569	12.131	2.623	0.422	0.295	0.0019	7.847	1.155	5.424	51.935
100SW16	0.0598	0.8701	11.575	2.315	0.360	0.225	3.647	0.643	0.461	11.409	2.263	0.298	0.212	0.0010	6.871	1.056	6.288	44.800
100SW14	0.0747	1.1002	14.673	2.935	0.481	0.306	3.652	0.661	0.665	14.675	2.935	0.425	0.295	0.0020	9.352	1.110	6.117	58.113
100SW12	0.1046	1.5254	20.116	4.023	0.638	0.407	3.631	0.647	1.058	20.121	4.023	0.622	0.404	0.0056	12.306	1.080	6.157	79.679
120SW18	0.0478	0.7939	14.622	2.437	0.306	0.186	4.292	0.621	0.324	12.372	1.833	0.224	0.168	0.0006	8.533	0.968	8.481	36.289
120SW16	0.0598	0.9897	18.153	3.025	0.374	0.227	4.283	0.615	0.464	17.069	2.720	0.301	0.212	0.0012	10.414	0.957	8.516	53.848
120SW14	0.0747	1.2496	23.011	3.835	0.501	0.310	4.291	0.633	0.670	23.014	3.835	0.430	0.296	0.0023	14.117	1.007	8.278	75.945
120SW12	0.1046	1.7346	31.614	5.269	0.665	0.412	4.269	0.619	1.072	31.620	5.269	0.635	0.407	0.0063	18.609	0.979	8.355	104.347
135SW14	0.0747	1.3616	30.888	4.576	0.514	0.312	4.763	0.614	0.673	30.725	4.533	0.433	0.297	0.0025	18.432	0.942	10.194	89.755
135SW12	0.1046	1.8915	42.491	6.295	0.681	0.414	4.740	0.600	1.080	42.499	6.295	0.641	0.408	0.0069	24.318	0.915	10.303	124.663

(1) Conforms to 1986 AISI Design Specifications; ASTM A568; ASTM C645; ASTM A446 (33ksi); ASTM A525 (hot dipped), A792 (aluminum-zinc) or A591 (electrolytic zinc thickness equivalent to hot-dipped per A525). (2) Design thickness without coating. (3) Deflection determination.

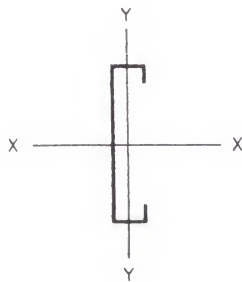


Table 11

SE: Physical Properties

Member	Dimension (in)				
	A	B	C	D	E
362SE20	3.625	2.500	2.500	0.500	1.50
362SE18	3.625	2.500	2.500	0.500	1.50
362SE16	3.625	2.500	2.500	0.625	1.50
362SE14	3.625	2.500	2.500	0.625	1.50
362SE12	3.625	2.500	2.500	0.750	1.50
40SE20	4.000	2.500	2.500	0.500	1.50
40SE18	4.000	2.500	2.500	0.500	1.50
40SE16	4.000	2.500	2.500	0.625	1.50
40SE14	4.000	2.500	2.500	0.625	1.50
40SE12	4.000	2.500	2.500	0.750	1.50
60SE20	6.000	2.500	2.500	0.500	1.50
60SE18	6.000	2.500	2.500	0.500	1.50
60SE16	6.000	2.500	2.500	0.625	1.50
60SE14	6.000	2.500	2.500	0.625	1.50
60SE12	6.000	2.500	2.500	0.750	1.50
80SE18	8.000	2.500	2.500	0.500	1.50
80SE16	8.000	2.500	2.500	0.625	1.50
80SE14	8.000	2.500	2.500	0.625	1.50
80SE12	8.000	2.500	2.500	0.750	1.50
100SE16	10.000	2.500	2.500	0.625	0.00
100SE14	10.000	2.500	2.500	0.625	0.00
100SE12	10.000	2.500	2.500	0.750	0.00
120SE16	12.000	2.500	2.500	0.625	0.00
120SE14	12.000	2.500	2.500	0.625	0.00
120SE12	12.000	2.500	2.500	0.750	0.00
135SE14	13.500	2.500	2.500	0.625	0.00
135SE12	13.500	2.500	2.500	0.750	0.00

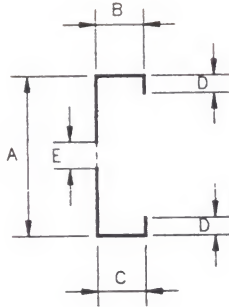


Table 12

SE: Structural Properties⁽¹⁾

Member	t ⁽²⁾ (in)	Gross Properties							Effective Properties					Torsional Properties				Ma (k-in)
		A ⁽²⁾ (in ²)	I _x (in ⁴)	S _x (in ³)	I _y (in ⁴)	S _y (in ³)	r _x (in)	r _y (in)	AE ⁽²⁾ (in ²)	I _x ⁽³⁾ (in ⁴)	S _x (in ³)	I _y (in ⁴)	S _y (in ³)	J (in ⁴)	C _w (in ³)	X _o (in)	j (in)	
362SE20	0.0359	0.3336	0.770	0.425	0.287	0.179	1.519	0.927	0.186	0.661	0.316	0.243	0.168	0.0001	0.805	2.106	2.696	6.531
362SE18	0.0478	0.4414	1.011	0.558	0.375	0.234	1.514	0.921	0.276	0.902	0.444	0.348	0.227	0.0003	1.041	2.091	2.683	9.113
362SE16	0.0598	0.5636	1.271	0.701	0.496	0.318	1.502	0.938	0.409	1.207	0.619	0.485	0.316	0.0007	1.514	2.179	2.708	12.657
362SE14	0.0747	0.6987	1.562	0.862	0.605	0.388	1.495	0.931	0.560	1.544	0.825	0.606	0.389	0.0013	1.825	2.160	2.691	16.673
362SE12	0.1046	0.9893	2.147	1.184	0.867	0.571	1.473	0.936	0.832	2.149	1.168	0.868	0.572	0.0036	2.860	2.223	2.692	23.472
40SE20	0.0359	0.3470	0.960	0.480	0.297	0.182	1.663	0.925	0.187	0.826	0.362	0.245	0.168	0.0001	0.984	2.047	2.765	7.426
40SE18	0.0478	0.4593	1.262	0.631	0.388	0.237	1.657	0.919	0.279	1.127	0.506	0.352	0.229	0.0003	1.274	2.033	2.752	10.343
40SE16	0.0598	0.5861	1.589	0.794	0.514	0.322	1.647	0.936	0.416	1.507	0.704	0.493	0.318	0.0007	1.832	2.118	2.770	14.335
40SE14	0.0747	0.7267	1.954	0.977	0.627	0.394	1.640	0.929	0.576	1.930	0.937	0.628	0.394	0.0014	2.211	2.100	2.754	18.883
40SE12	0.1046	1.0285	2.694	1.347	0.899	0.579	1.618	0.935	0.872	2.696	1.332	0.901	0.579	0.0038	3.427	2.161	2.749	26.693
60SE20	0.0359	0.4188	2.407	0.802	0.340	0.191	2.397	0.901	0.190	2.059	0.597	0.251	0.170	0.0002	2.341	1.789	3.370	12.324
60SE18	0.0478	0.5549	3.173	1.058	0.444	0.250	2.391	0.895	0.286	2.858	0.878	0.365	0.232	0.0004	3.042	1.775	3.362	17.692
60SE16	0.0598	0.7057	4.017	1.339	0.590	0.339	2.386	0.914	0.430	3.809	1.206	0.518	0.324	0.0008	4.227	1.852	3.341	24.258
60SE14	0.0747	0.8761	4.955	1.652	0.721	0.414	2.378	0.907	0.604	4.883	1.595	0.681	0.406	0.0016	5.124	1.834	3.330	31.869
60SE12	0.1046	1.2377	6.902	2.301	1.038	0.609	2.361	0.916	0.974	6.905	2.291	1.040	0.610	0.0045	7.686	1.888	3.293	45.574
80SE18	0.0478	0.6505	6.194	1.548	0.484	0.257	3.086	0.862	0.289	5.554	1.269	0.372	0.234	0.0005	5.791	1.582	4.364	25.752
80SE16	0.0598	0.8253	7.857	1.964	0.644	0.349	3.085	0.884	0.435	7.465	1.789	0.531	0.327	0.0010	7.928	1.651	4.300	35.805
80SE14	0.0747	1.0255	9.708	2.427	0.787	0.426	3.077	0.876	0.614	9.563	2.352	0.705	0.411	0.0019	9.634	1.635	4.296	46.855
80SE12	0.1046	1.4469	13.586	3.396	1.137	0.627	3.064	0.886	1.002	13.590	3.389	1.112	0.623	0.0053	14.254	1.683	4.226	67.269
100SE16	0.0598	0.9447	13.344	2.669	0.685	0.355	3.758	0.851	0.499	12.714	2.452	0.539	0.328	0.0011	13.071	1.494	5.634	48.956
100SE14	0.0747	1.1749	16.512	3.302	0.837	0.435	3.749	0.844	0.713	16.269	3.209	0.719	0.414	0.0022	15.906	1.478	5.641	63.828
100SE12	0.1046	1.6561	23.163	4.633	1.210	0.639	3.740	0.855	1.189	23.168	4.627	1.147	0.630	0.0060	23.372	1.522	5.536	91.746
120SE16	0.0598	1.0645	20.726	3.454	0.716	0.361	4.413	0.820	0.502	18.736	2.853	0.544	0.330	0.0013	19.753	1.366	7.338	57.698
120SE14	0.0747	1.3243	25.666	4.278	0.875	0.441	4.402	0.813	0.718	25.300	4.166	0.728	0.416	0.0025	24.058	1.351	7.357	82.783
120SE12	0.1046	1.8653	36.052	6.009	1.267	0.648	4.396	0.824	1.203	36.059	6.004	1.169	0.633	0.0068	35.217	1.391	7.217	118.994
135SE14	0.0747	1.4363	34.254	5.075	0.899	0.444	4.883	0.791	0.721	33.400	4.830	0.733	0.417	0.0027	31.462	1.270	8.886	96.333
135SE12	0.1046	2.0222	48.145	7.133	1.303	0.653	4.879	0.803	1.211	48.152	7.128	1.182	0.636	0.0074	45.971	1.308	8.718	141.246

(1) Conforms to 1986 AISI Design Specifications; ASTM A568; ASTM C645; ASTM A446 (33ksi); ASTM A525 (hot dipped), A792 (aluminum-zinc) or A591 (electrolytic zinc thickness equivalent to hot-dipped per A525). (2) Design thickness without coating. (3) Deflection determination.

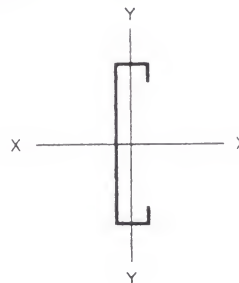


Table 13

ST: Physical Properties

Member	Dimension (in)				t ⁽¹⁾ (in)	ANET ⁽²⁾ (in ²)	Weight ⁽³⁾	
	A	B	C	D			lb/ft	kg/m
158ST25	1.625	1.250	1.328	0.328	0.0188	0.085	0.33	0.49
212ST25	2.500	1.250	1.328	0.328	0.0188	0.102	0.38	0.57
358ST25	3.625	1.250	1.328	0.328	0.0188	0.123	0.45	0.67
400ST25	4.000	1.250	1.328	0.328	0.0188	0.130	0.48	0.71
600ST25	6.000	1.250	1.328	0.328	0.0188	0.167	0.61	0.91
158ST22	1.625	1.250	1.328	0.328	0.0284	0.100	0.45	0.67
212ST22	2.500	1.250	1.328	0.328	0.0284	0.103	0.53	0.79
358ST22	3.625	1.250	1.328	0.328	0.0284	0.135	0.64	0.95
400ST22	4.000	1.250	1.328	0.328	0.0284	0.146	0.68	1.01
600ST22	6.000	1.250	1.328	0.328	0.0284	0.203	0.88	1.31
158ST20	1.625	1.250	1.328	0.328	0.0329	0.144	0.56	0.83
212ST20	2.500	1.250	1.328	0.328	0.0329	0.173	0.73	1.09
358ST20	3.625	1.250	1.328	0.328	0.0329	0.210	0.85	1.27
400ST20	4.000	1.250	1.328	0.328	0.0329	0.223	0.90	1.34
600ST20	6.000	1.250	1.328	0.328	0.0329	0.288	1.17	1.74

(1) Design thickness without coating. (2) Excluding coating through section at hole. (3) Average shipping weight including coating.

ST



Table 14

ST: Structural Properties⁽¹⁾

Member	I _x ⁽²⁾ (in ⁴)	S _x ⁽²⁾ (in ³)	r _x (in)	I _y ⁽²⁾ (in ⁴)	S _y ⁽²⁾ (in ³)	r _y (in)	Allowable moment (k-in)
158ST25	0.038	0.040	0.678	0.018	0.024	0.484	0.795
212ST25	0.101	0.071	1.012	0.019	0.024	0.480	1.398
358ST25	0.239	0.113	1.415	0.019	0.024	0.464	2.234
400ST25	0.302	0.123	1.545	0.019	0.024	0.459	2.441
600ST25	0.773	0.184	2.209	0.019	0.024	0.427	3.633
212ST22	0.155	0.110	1.008	0.032	0.037	0.475	2.187
358ST22	0.367	0.182	1.410	0.033	0.037	0.460	3.606
400ST22	0.463	0.209	1.539	0.033	0.038	0.454	4.133
600ST22	1.224	0.342	2.202	0.034	0.038	0.422	6.762
212ST20	0.175	0.123	1.006	0.039	0.044	0.473	2.706
358ST20	0.414	0.213	1.407	0.045	0.046	0.458	4.698
400ST20	0.523	0.246	1.536	0.046	0.047	0.452	5.423
600ST20	1.385	0.437	2.199	0.051	0.048	0.420	9.642

(1) Yield strength (F_y) is 33 ksi. Assumes full lateral support. For laterally unbraced structural member, see Section C3.1.2 of the 1986 AISI Design Specifications. (2) Effective properties based on 1986 AISI Design Specifications.

ST

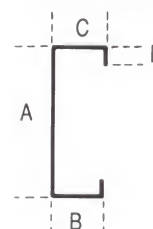


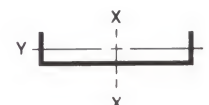
Table 15

CR: Structural Properties⁽¹⁾

Member	I _x ⁽²⁾ (in ⁴)	S _x ⁽²⁾ (in ³)	r _x (in)	Allowable moment (k-in)
158CR25	0.025	0.022	0.663	0.443
212CR25	0.070	0.043	0.992	0.848
358CR25	0.172	0.061	1.366	1.209
400CR25	0.222	0.068	1.488	1.340
600CR25	0.629	0.101	2.115	1.990
212CR22	0.116	0.073	1.035	1.450
358CR22	0.281	0.128	1.417	2.533
400CR22	0.354	0.149	1.541	2.949
600CR22	0.989	0.220	2.185	4.360
212CR20	0.147	0.095	1.007	1.871
358CR20	0.328	0.160	1.416	3.170
400CR20	0.415	0.185	1.541	3.670
600CR20	1.046	0.304	2.185	6.020

(1) Yield strength (F_y) is 33 ksi. Assumes full lateral support. For laterally unbraced structural member, see Section C3.1.2 of the 1986 AISI Design Specifications. (2) Effective properties based on 1986 AISI Design Specifications.

CR



Joist framing is typically constructed using Unimast's SJ members, 6" and deeper. Smaller SJ members can be used for shorter spans and lighter loads. The following tables contain information on Maximum Allowable Clear Spans and

Maximum allowable Uniform Loads for SJ joist members. See "Design Considerations" on page 39 for information on table data calculations. Contact the Unimast Technical Service Department nearest you for additional information.

Table 16

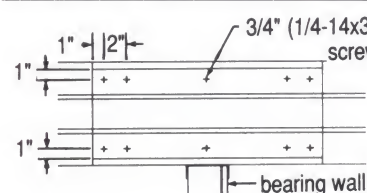
Joists: Maximum Allowable Clear Spans⁽¹⁾

Single and Double-Span

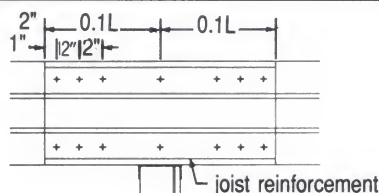
Member ⁽²⁾	Joist spacing (in)	Uniform load (psf)									
		10 dead, 20 live		10 dead, 30 live		10 dead, 40 live		10 dead, 50 live		20 dead, 40 live	
		1-span	2-span ⁽³⁾	1-span	2-span ⁽³⁾	1-span	2-span ⁽³⁾	1-span	2-span ⁽³⁾	1-span	2-span ⁽³⁾
60SJ20	12	15'9"	17'8"af	13'9"	15'5"bf	12'6"	14'0"bf	11'7"	12'8"bf	12'0"	12'8"bf
	16	14'4"	16'1"bf	12'6"	13'9"bf	11'4"	11'8"bf	10'5"	10'2"cf	10'5"	10'1"cf
	24	12'0"	12'8"bf	10'5"	10'1"cf	9'3"		8'4"		8'4"	
60SJ18	12	17'3"	19'4"	15'1"	16'11"	13'8"	15'5"	12'9"	14'3"af	13'8"	15'5"bf
	16	15'8"	17'7"	13'8"	15'5"af	12'5"	14'0"bf	11'7"	13'0"bf	12'5"	14'0"bf
	24	13'8"	15'5"bf	12'0"	13'5"bf	10'10"	12'2"cf	10'1"	11'4"cf	10'2"	12'0"cf
60SJ16	12	18'8"	21'0"	16'4"	18'4"	14'10"	16'8"	13'9"	15'6"	14'10"	16'8"af
	16	17'0"	19'1"	14'10"	16'8"	13'6"	15'2"af	12'6"	14'1"af	13'6"	15'2"af
	24	14'10"	16'8"af	13'0"	14'7"af	11'9"	13'3"bf	10'11"	12'3"bf	11'6"	13'3"bf
60SJ14	12	20'0"	22'6"	17'6"	19'8"	15'11"	17'11"	14'9"	16'7"	15'11"	17'10"b
	16	18'2"	20'5"	15'11"	17'10"	14'5"	16'3"	13'5"	15'1"	14'5"	16'3"af
	24	15'11"	17'10"	13'11"	15'7"	12'7"	14'2"af	11'9"	13'2"af	12'7"	14'2"af
725SJ18	12	20'2"	22'7"	17'7"	19'9"	16'0"	17'11"	14'10"	16'8"b	16'0"	17'11"b
	16	18'3"	20'6"	16'0"	17'11"b	14'6"	16'4"b	13'6"	15'2"b	14'3"	16'4"bf
	24	16'0"	17'11"b	13'11"	15'8"bf	12'8"	14'3"cf	11'8"	12'7"cf	11'8"	12'7"cf
725SJ16	12	21'10"	24'6"	19'1"	21'5"	17'4"	19'5"	16'1"	18'1"	17'4"	19'5"b
	16	19'10"	22'3"	17'4"	19'5"	15'9"	17'8"	14'7"	16'5"b	15'9"	17'8"b
	24	17'4"	19'5"	15'2"	17'0"b	13'9"	15'5"bf	12'9"	14'4"bf	13'2"	15'5"cf
725SJ14	12	23'5"	26'3"	20'5"	22'11"	18'7"	20'10"	17'3"	19'4"	18'7"	20'10"b
	16	21'3"	23'10"	18'7"	20'10"	16'10"	18'11"	15'8"	17'7"	16'10"	18'11"b
	24	18'7"	20'10"	16'3"	18'3"	14'9"	16'7"	13'8"	15'4"	14'8"	16'7"b
80SJ18	12	21'10"	24'6"	19'1"	21'5"	17'4"	19'5"b	16'1"	18'1"b	17'4"	19'5"b
	16	19'10"	22'3"	17'4"	19'5"b	15'9"	17'8"b	14'7"	16'5"d	15'3"	16'10"d
	24	17'4"	19'5"b	15'2"	16'11"d	13'8"	14'5"d	12'5"	12'8"d	12'5"	12'7"d
80SJ16	12	23'8"	26'7"	20'8"	23'2"	18'9"	21'1"	17'5"	19'7"	18'9"	21'1"
	16	21'6"	24'2"	18'9"	21'1"	17'1"	19'2"	15'10"	17'9"b	17'1"	19'2"b
	24	18'9"	21'1"	16'5"	18'5"b	14'11"	16'9"b	13'10"	15'6"df	14'2"	16'9"df
80SJ14	12	25'4"	28'6"	22'2"	24'11"	20'2"	22'7"	18'8"	21'0"	20'2"	22'7"
	16	23'1"	25'11"	20'2"	22'7"	18'4"	20'6"	17'0"	19'1"	18'4"	20'6"
	24	20'2"	22'7"	17'7"	19'9"	16'0"	17'11"	14'10"	16'8"b	15'9"	17'11"b
925SJ16	12	26'8"	29'11"	23'4"	26'2"	21'2"	23'9"	19'8"	22'1"b	21'2"	23'9"b
	16	24'3"	27'3"	21'2"	23'9"	19'3"	21'7"b	17'10"	20'1"b	19'3"	21'7"b
	24	21'2"	23'9"b	18'6"	20'9"b	16'10"	18'10"d	15'7"	17'6"d	15'9"	18'3"d
925SJ14	12	28'7"	32'2"	25'0"	28'1"	22'9"	25'6"	21'1"	23'8"	22'9"	25'6"
	16	26'0"	29'2"	22'9"	25'6"	20'8"	23'2"	19'2"	21'6"	20'8"	23'2"
	24	22'9"	25'6"	19'10"	22'3"	18'0"	20'3"b	16'9"	18'10"b	17'6"	20'3"b
115SJ16	12	32'0"	35'11"	28'0"	31'5"	25'5"	28'6"b	23'7"	26'6"b	24'9"	28'6"b
	16	29'1"	32'8"	25'5"	28'6"b	23'1"	25'11"b	21'5"	24'1"b	21'5"	24'0"b
	24	24'9"	28'6"b	21'5"	24'0"b	19'2"	20'6"d	17'6"	18'0"d	17'6"	18'0"d
115SJ14	12	34'4"	38'7"	30'0"	33'9"	27'3"	30'8"	25'4"	28'5"	27'3"	30'8"
	16	31'3"	35'1"	27'3"	30'8"	24'9"	27'10"	23'0"	25'10"b	24'9"	27'10"b
	24	27'3"	30'8"	23'10"	26'9"b	21'8"	24'4"b	20'1"	22'7"b	20'8"	24'4"b
135SJ14	12	39'5"	44'3"	34'5"	38'8"	31'3"	35'1"	29'0"	32'7"	31'3"	35'1"
	16	35'10"	40'2"	31'3"	35'1"	28'5"	31'11"b	26'5"	29'7"b	27'5"	31'11"b
	24	31'3"	35'1"	27'4"	30'8"b	24'6"	27'10"b	22'4"	25'9"b	22'4"	25'10"b

(1) Based on allowable design stress or live load deflection limitation of L/360, whichever is less. See Design Considerations, page 39. (2) Allowable clear spans based on SJ members with 40 ksi yield strength (F_y). Contact Unimast Technical department for information of 33 ksi and 50 ksi members. All joists must be checked for web crippling (see Tables 22 and 23). Joists must have 10" of unpunched steel at end supports. When field cuts reduce this minimum, joist web stiffeners may be required. (3) Joist reinforcing required for a minimum distance of 0.1 span each side, total of 0.2 span, of center support. Screw attachment pattern is "a" unless other pattern is designated. See screw patterns below.

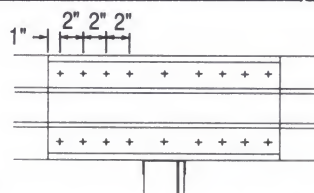
Screw Pattern "a"



Screw Pattern "b"



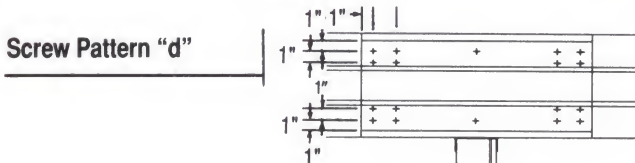
Screw Pattern "c"



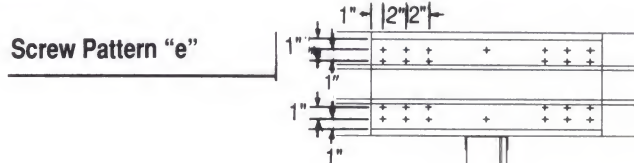
Screw Pattern "f"



Screw Pattern "d"



Screw Pattern "e"





Typical joist reinforcement detail.

Table 17

Joists: Allowable Uniform Loads (lb/ft)⁽¹⁾

Single and Double Span

Member ⁽²⁾	Single span																	
	8'	9'	10'	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'	21'	22'	23'	24'	25'
362SJ20	46	32	24	18	14	11												
362SJ18	60	42	31	23	18	14	11											
362SJ16	76	54	39	29	23	18	14	12	10									
362SJ14	93	66	48	36	28	22	17	14	12	10								
40SJ20	57	40	29	22	17	13	11											
40SJ18	75	53	39	29	22	18	14	11										
40SJ16	95	67	49	37	28	22	18	14	12	10								
40SJ14	117	82	60	45	35	27	22	18	15	12	10							
60SJ20	125	106	78	59	45	36	28	23	19	16	13	11	10					
60SJ18	193	141	103	77	59	47	37	30	25	21	18	15	13	11	10			
60SJ16	247	179	131	98	76	59	48	39	32	27	22	19	16	14	12	11		
60SJ14	304	221	161	121	93	73	59	48	39	33	28	23	20	17	15	13	12	10
72SJ18	254	201	162	123	94	74	59	48	40	33	28	24	20	18	15	13	12	10
72SJ16	326	257	208	156	120	95	76	62	51	42	36	30	26	22	20	17	15	13
72SJ14	401	317	256	192	148	117	93	76	62	52	44	37	32	28	24	21	19	16
80SJ18	239	213	186	154	120	95	76	62	51	42	36	30	26	22	20	17	15	13
80SJ16	376	297	241	199	153	121	97	78	65	54	45	39	33	29	25	22	19	17
80SJ14	464	367	297	245	189	149	119	97	80	66	56	48	41	35	31	27	24	21
92SJ16	417	369	299	247	208	173	138	113	93	77	65	55	47	41	36	31	27	24
92SJ14	577	456	369	305	256	213	171	139	114	95	80	68	59	51	44	39	34	30
115SJ16	347	308	277	252	231	213	187	163	143	127	113	96	82	71	62	54	48	42
115SJ14	677	602	514	425	357	304	262	229	198	165	139	118	101	88	76	67	59	52
135SJ14	587	522	470	427	392	355	306	267	234	208	185	166	150	132	115	101	88	78
Member ⁽²⁾	Double span																	
	8'	9'	10'	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'	21'	22'	23'	24'	25'
362SJ20	65	46	33	25	19	15	12	10										
362SJ18	86	60	44	33	25	20	16	13	11									
362SJ16	108	76	55	42	32	25	20	16	13	11								
362SJ14	132	93	68	51	39	31	25	20	17	14	12	10						
40SJ20	81	57	42	31	24	19	15	12	10									
40SJ18	107	75	55	41	32	25	20	16	13	11								
40SJ16	135	95	69	52	40	31	25	20	17	14	12	10						
40SJ14	165	116	85	64	49	38	31	25	21	17	14	12	11					
60SJ20	107	93	82	72	64	50	40	33	27	22	19	16	14	12	10			
60SJ18	222	187	145	109	84	66	53	43	35	30	25	21	18	16	14	12	11	9
60SJ16	323	254	185	139	107	84	67	55	45	38	32	27	23	20	17	15	13	12
60SJ14	398	312	228	171	132	104	83	67	56	46	39	33	28	25	21	19	16	15
72SJ18	218	188	164	145	129	105	84	68	56	47	40	34	29	25	22	19	17	15
72SJ16	377	319	272	221	170	134	107	87	72	60	50	43	37	32	28	24	21	19
72SJ14	524	414	335	272	210	165	132	107	88	74	62	53	45	39	34	30	26	23
80SJ18	209	183	161	143	128	115	104	87	72	60	50	43	37	32	28	24	21	19
80SJ16	376	322	279	244	214	171	137	111	92	76	64	55	47	40	35	31	27	24
80SJ14	606	479	388	321	268	210	168	137	113	94	79	67	58	50	43	38	33	30
92SJ16	361	314	276	244	218	196	177	159	131	109	92	78	67	58	50	44	39	34
92SJ14	628	534	459	398	335	285	242	197	162	135	114	97	83	72	62	55	48	42
115SJ16	315	277	246	221	199	181	166	152	140	129	120	112	104	97	87	76	67	59
115SJ14	591	515	453	403	360	324	293	267	243	223	197	168	144	124	108	94	83	74
135SJ14	532	467	415	372	335	305	278	255	235	217	201	187	174	162	152	142	125	111

(1) Based on allowable design stress or live load deflection limitation of L/360, whichever is less. See Design Considerations, page 39. (2) Allowable clear spans based on SJ members with 40 ksi yield strength (F_y). Contact Unimast Technical department for information of 33 ksi and 50 ksi members. All joists must be checked for web crippling (see Tables 22 and 23). Joists must have 10" of unpunched steel at end supports. When field cuts reduce this minimum, joist web stiffeners may be required.

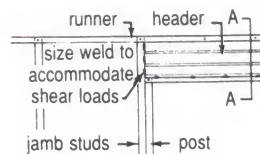
Table 18

Headers: Allowable Uniform Loads (lb/ft)							
Span (ft)	60SJ				Boxed Configuration		
	20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
4	490	1160	1982	2438	1013	1989	3187
6	327	656	881	1083	676	1108	1416
8	245	369	495	609	456	623	797
10	156	205	261	322	292	399	510
12	90	119	151	186	189	240	295
14	57	75	95	117	119	151	186

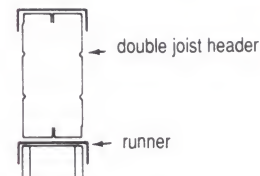
Span (ft)	80SJ			925SJ		115SJ		135SJ
	18 gauge	16 gauge	14 gauge	16 gauge	14 gauge	16 gauge	14 gauge	14 gauge
4	940	1844	3606	1642	3209	1367	2671	2321
6	627	1230	1628	1095	1949	911	1780	1547
8	470	700	916	821	1096	684	1335	1160
10	324	448	586	529	702	547	911	928
12	225	307	378	367	487	456	633	759
14	152	193	238	270	342	341	465	558

Uniform load values are for headers made of two boxed unpunched SJ sections, with stiffened end conditions, as shown. Maximum total load deflection is limited to $L/360$. Header sections must be checked for web crippling under concentrated loads and at end supports (see Tables 22 and 23).

Header detail



(Section A-A)



Floor Bridging

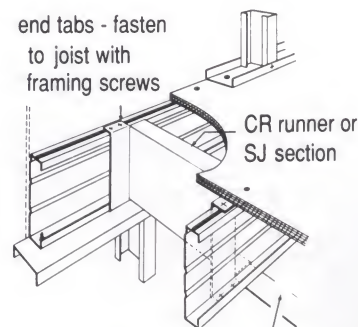
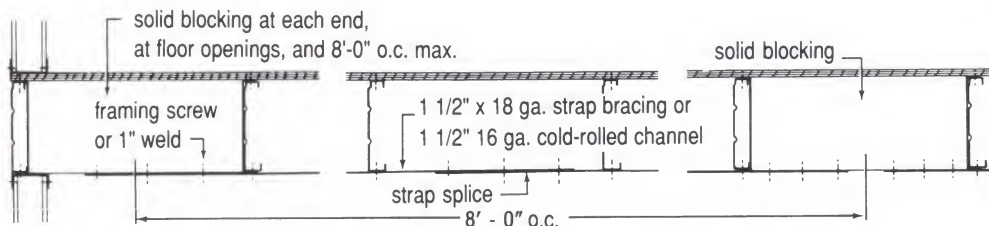
Install bridging immediately after joists are erected and before construction loads are applied to prevent flange rotation and to support flanges in compression.

Lateral support is provided by subfloor or deck material on the top flanges. Bridging consisting of solid blocking and strap bracing or $1\frac{1}{2}$ " cold-rolled channels screw-attached or welded to bottom joist flanges. Spacing of bridging must be calculated based on actual stress.

Solid blocking, a field-cut CR runner or SJ joist section, is welded or screw-attached between outer joists, over all interior supports and adjacent to openings at max. 8' o.c. Cold-rolled channels or strap bracing of $1\frac{1}{2}$ " x 18-gauge corrosion-resistant steel is screw-attached to bottom joist flange between solid blocking.

Where sub-floors or decking do not provide lateral support, joists must be braced at all bearing points and at intervals within spans. For joists in

continuous span conditions, portions of the bottom flanges are in compression and must be laterally braced, based on design requirements.



$1\frac{1}{2}$ " x 18 ga. strap bracing or $1\frac{1}{2}$ " x 16 ga. cold-rolled channel - fasten to CR runner blocking with 3 equally-spaced framing screws

Table 19

Joist End Clip: Maximum Allowable Load

Clip length (in)	No. of screws (each leg)	Allowable load (lb/clip)
6	3	560
8	4	890
10	5	980

Allowable loads based on Unimast 2" x 2" 14 gauge end clips attached with 1/2" Type S-12 screws of quantity shown into SJ member of .0359" thickness and 40 ksi yield strength (F_y).

Joist end clip

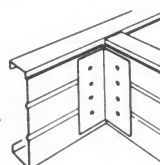


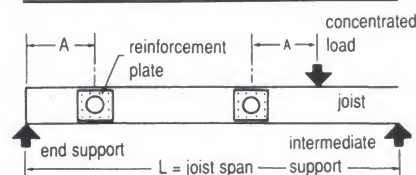
Table 20

Pipe Opening: Maximum Pipe Opening and Web Reinforcement

Joists size	"d" max. hole dia. (in)	"b" plate size (in)	"a" hole spacing (in)	"c" end dist. (in)	"A" min. distance to concentrated load or support (1' 0" min.)
115SJ	6 1/8	9	2 3/8	9 1/8	L/6
925SJ	5 1/8	9	2 3/8	1 5/8	L/25
80SJ	4 1/4	7	1 7/8	1 1/8	L/16
725SJ	4 1/4	7	1 7/8	1 1/8	L/16
60SJ	3 1/2	5 1/4	1 7/8	1 5/8	L/10

Plate thickness is 14 gauge (.0710" minimum thickness).

Pipe opening reinforcement



Reinforcement plate

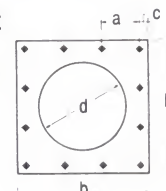


Table 21

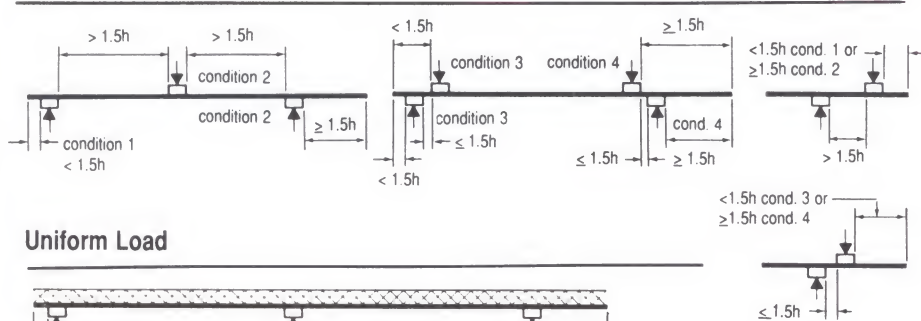
**Web Crippling:
Maximum Allowable Loads⁽¹⁾
Joist Web Stiffener**

Joist style & gauge	Allowable load ⁽¹⁾ (lb/2 piece web stiffener)
SJ14	9000
SJ16	8500
SJ18, 20	7000



Web stiffening provides added reinforcement for SJ and SN members.

Concentrated Loads



Uniform Load

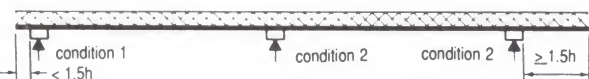


Table 22

Web Crippling: Maximum Allowable Loads (lbs)

Single Joist

Member	Inside depth "h" (in)	Condition 1				Condition 2				Condition 3				Condition 4			
		1 1/4"	3 1/2"	4"	6"	1 1/4"	3 1/2"	4"	6"	1 1/4"	3 1/2"	4"	6"	1 1/4"	3 1/2"	4"	6"
135SJ14	13.272	850	1069	1118	1312	1560	1854	1919	2281	543	683	714	839	1299	1349	1360	1404
115SJ14	11.272	912	1147	1200	1409	1636	1944	2013	2392	602	757	791	929	1511	1569	1581	1633
115SJ16	11.301	520	681	717	861	985	1212	1277	1593	327	429	452	542	764	801	809	841
925SJ14	9.022	982	1236	1292	1517	1721	2046	2118	2517	667	840	878	1031	1749	1816	1831	1891
925SJ16	9.051	575	754	794	953	1054	1296	1366	1705	379	497	523	628	952	998	1008	1048
80SJ14	7.772	1021	1285	1343	1577	1769	2102	2177	2586	704	886	926	1088	1881	1954	1970	2034
80SJ16	7.801	606	794	836	1004	1092	1343	1416	1767	408	535	563	676	1057	1107	1118	1163
80SJ18	7.825	347	477	506	621	664	872	937	1195	226	310	329	404	559	592	599	629
725SJ14	7.022	1044	1314	1374	1613	1797	2136	2212	2628	726	913	955	1122	1961	2036	2053	2120
725SJ16	7.051	624	818	862	1034	1115	1372	1446	1804	425	558	587	705	1120	1173	1185	1232
725SJ18	7.075	362	496	526	646	682	897	963	1228	239	328	348	428	608	644	652	684
60SJ14	5.772	1083	1363	1425	1674	1845	2193	2270	2697	763	959	1003	1178	2093	2174	2191	2263
60SJ16	5.801	665	859	904	1085	1154	1419	1495	1886	454	595	627	753	1224	1282	1295	1347
60SJ18	5.825	386	529	561	689	713	937	1007	1284	262	359	381	468	690	731	740	776
60SJ20	5.849	186	272	291	368	378	553	600	786	121	177	190	239	307	331	336	357

Table 23

Web Crippling: Maximum Allowable Loads (lbs)

Joists Back-To-Back

Member	Inside depth "h" (in)	Condition 1				Condition 2				Condition 3				Condition 4			
		1 1/4"	3 1/2"	4"	6"	1 1/4"	3 1/2"	4"	6"	1 1/4"	3 1/2"	4"	6"	1 1/4"	3 1/2"	4"	6"
135SJ14	13.272	4059	4989	5148	5703	4077	5368	5590	6361	2051	2520	2601	2881	4213	5547	5777	6574
115SJ14	11.272	4059	4989	5148	5703	4077	5368	5590	6361	2133	2621	2705	2997	4416	5816	6056	6891
115SJ16	11.301	2705	3371	3485	3883	2844	3798	3962	4531	1257	1566	1619	1804	2705	3613	3769	4311
925SJ14	9.022	3927	4827	4981	5518	4077	5368	5590	6361	2225	2734	2822	3126	4645	6117	6370	7249
925SJ16	9.051	2705	3371	3485	3883	2844	3798	3962	4531	1328	1655	1711	1907	2893	3863	4030	4610
80SJ14	7.772	3852	4734	4885	5412	4077	5368	5590	6361	2276	2797	2887	3198	4773	6285	6544	7448
80SJ16	7.801	2647	3298	3410	3799	2844	3798	3962	4531	1368	1705	1763	1964	2997	4003	4175	4776
80SJ18	7.825	1803	2279	2361	2645	1971	2670	2790	3207	821	1038	1075	1204	1867	2528	2642	3037
725SJ14	7.022	3806	4678	4828	5348	4077	5368	5590	6361	2307	2835	2926	3241	4849	6386	6649	7567
725SJ16	7.051	2609	3251	3361	3744	2844	3798	3962	4531	1392	1735	1794	1998	3059	4086	4262	4875
725SJ18	7.075	1799	2274	2356	2639	1971	2670	2790	3207	840	1062	1100	1232	1918	2598	2715	3121
60SJ14	5.772	3731	4585	4732	5242	4077	5368	5590	6361	2358	2898	2991	3313	4976	6553	6824	7765
60SJ16	5.801	2546	3173	3280	3654	2844	3798	3962	4531	1432	1784	1845	2055	3164	4225	4408	5042
60SJ18	5.825	1747	2208	2287	2562	1971	2670	2790	3207	871	1101	1141	1278	2004	2715	2837	3261
60SJ20	5.849	1079	1388	1441	1626	1231	1696	1776	2054	463	596	618	698	1110	1530	1602	1853

Allowable loads based on SJ members with 40 ksi yield strength (F_y). Contact Unimast Technical Department for information on 33 ksi and 50 ksi members. Allowable loads for conditions shown in details are for web crippling only and apply to joists with solid web at reaction points. See AISI 1986 Design Specifications, Section C3.4 and C3.5, for calculating maximum allowable combined bending and web crippling loads and Section D1.1 for connections to achieve these loads. SJ members must have 10" of unpunched steel at end supports. When field cuts reduce this minimum, joist web stiffeners may be required.

Unimast SJ members are used in joist applications and also in load-bearing wall and curtain wall applications. (Tall walls are not addressed in this literature. Contact the Unimast Technical Department nearest you for further information.)

Axial load bearing studs are designed to carry both vertical loads and lateral loads. Unimast manufactures the SJ stud for use in axial load bearing conditions. *The ST members are not designed to carry axial loads.* The following tables contain allowable axial loads for specific heights and conditions

based on AISI Specifications. See "Design Considerations" on page 39 for information on table data calculations. Contact the Unimast Technical Service Department nearest you for additional information.

Table 24 contains allowable axial construction loads with no wind or lateral loads. This condition occurs during construction prior to the application of sheathing and finish materials. Tables 25-31 contain allowable axial loads for various lateral loadings; 5 psf, 15 psf, 20 psf, 25 psf, 30 psf, 35 psf and 40 psf.

Table 24

0 psf

SJ (3 5/8", 4")

SJ Studs: Allowable Axial Loads (lbs)

Construction Loads

Height (ft)	Bracing	362 SJ (3 5/8")				40 SJ (4")			
		20	18	16	14	20	18	16	14
8	none	977	1338	1904	2497	890	1368	2177	3044
	mid-pt	2758	3522	4498	5325	2479	3576	5112	6970
	1/3 pt	3388	4298	5327	6240	2970	4265	5946	8042
9	none	795	1109	1596	1973	722	1129	1816	2405
	mid-pt	2322	2985	3887	4645	2155	3124	4532	6223
	1/3 pt	3108	3943	4901	5744	2769	3976	5357	7518
10	none	665	945	1374	1598	602	957	1472	1948
	mid-pt	1898	2455	3240	3922	1800	2630	3901	5420
	1/3 pt	2797	3550	4429	5197	2544	3655	5124	6939
11	none	568	823	1152	1321	513	830	1216	1610
	mid-pt	1581	2056	2721	3316	1498	2200	3281	4607
	1/3 pt	2454	3118	3911	4599	2298	3303	4650	6307
12	none	495	730	968	1110	445	704	1022	1353
	mid-pt	1339	1752	2325	2853	1268	1873	2801	3961
	1/3 pt	2089	2659	3354	3956	2028	2920	4135	5623
14	none	392	553	711	815	350	518	751	994
	mid-pt	1022	1326	1770	2201	948	1415	2130	3053
	1/3 pt	1542	1971	2490	2952	1509	2181	3108	4251
16	none	783	1049	1407	1770	739	1117	1691	2455
	mid-pt	1188	1524	1929	2297	1162	1685	2406	3307
	1/3 pt								
18	none	632	857	1155	1467	596	912	1388	2037
	mid-pt	945	1217	1543	1846	923	1345	1924	2657
	1/3 pt								
20	none	524	719	973	1244	494	764	1169	1730
	mid-pt	770	997	1266	1521	753	1101	1578	2188
	1/3 pt								

Height (ft)	Bracing	60 SJ (6")				725 SJ (7 1/4")			80 SJ (8")		
		20	18	16	14	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
8	none	1219	1728	2531	3364	1542	2374	3310	1464	2420	3589
	mid-pt	3448	4957	6980	9437	4634	6850	9715	4520	7169	10813
	1/3 pt	3961	5725	7972	10846	5496	8026	11438	5408	8464	12834
9	none	963	1365	2000	2658	1218	1876	2616	1156	1912	2835
	mid-pt	3175	4555	6453	8702	4222	6288	8891	4095	6550	9847
	1/3 pt	3825	5529	7712	10494	5313	7776	11072	5219	8189	12404
10	none	780	1106	1620	2153	987	1519	2119	937	1549	2297
	mid-pt	2870	4105	5864	7880	3762	5659	7971	3621	5857	8768
	1/3 pt	3674	5310	7424	10104	5108	7497	10663	5009	7881	11925
11	none	645	914	1339	1779	815	1256	1751	774	1280	1898
	mid-pt	2533	3608	5212	6972	3253	4965	6953	3096	5092	7575
	1/3 pt	3508	5070	7107	9678	4882	7188	10211	4775	7541	11394
12	none	542	768	1125	1495	685	1055	1471	651	1075	1595
	mid-pt	2166	3072	4499	5980	2741	4221	5885	2602	4301	6380
	1/3 pt	3326	4809	6763	9217	4634	6850	9715	4520	7169	10813
14	none	398	564	826	1098	503	775	1081	790	1172	1722
	mid-pt	1592	2257	3305	4394	2013	3101	4324	1912	3160	4687
	1/3 pt	2917	4223	5995	8196	4074	6086	8595	3943	6327	9500
16	none	1219	1728	2531	3364	1542	2374	3310	1464	2420	3589
	mid-pt	2249	3558	5126	7050	3428	5204	7303	3277	5356	7985
	1/3 pt										
18	none	963	1365	2000	2658	1218	1876	2616	1156	1912	2835
	mid-pt	1962	2864	4182	5805	2741	4221	5885	2602	4301	6380
	1/3 pt										
20	none	780	1106	1620	2153	987	1519	2119	937	1549	2297
	mid-pt	1598	2343	3429	4787	2220	3419	4767	2108	3484	5167
	1/3 pt										

Allowable axial loads based on SJ members with 40 ksi yield strength (Fy). Contact Unimast Technical Department for information on 33 ksi and 50 ksi members. Allowable axial loads based on various bracing conditions: none--studs unbraced; mid-pt -- mechanical bracing at the mid-point of the stud clear height; 1/3 pt -- mechanical bracing at third points of stud clear height. See Design Considerations, page 39.

Steel framing speeds construction
for both exterior walls and
interior partitions.



SJ (3 5/8", 4")



SJ (6", 7 1/4", 8")



Table 25

5 psf

SJ Studs: Allowable Axial Loads (lbs)

Interior Wall

Height (ft)	Spacing (in o.c.)	362 SJ (3 5/8")				40 SJ (4")			
		20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge
8	12	3143	4015	5164	6118	2722	3929	5650	7708
	16	3143	4015	5164	6118	2722	3929	5650	7708
	24	3143	4015	5164	6118	2722	3929	5650	7708
9	12	3142	4014	5163	6117	2722	3929	5649	7707
	16	3142	4014	5163	6117	2722	3929	5649	7707
	24	2911	4014	5163	6117	2722	3929	5649	7707
10	12	3142	4013	5162	6116	2722	3928	5648	7706
	16	2928	4013	5162	6116	2722	3928	5648	7706
	24	2528	3617	4978	6116	2530	3906	5648	7706
11	12	2816	3900	5160	6114	2721	3927	5647	7705
	16	2564	3620	4929	6114	2606	3927	5647	7705
	24	2141	3147	4395	5589	2244	3517	5257	7268
12	12	2458	3456	4673	5857	2571	3866	5589	7523
	16	2203	3168	4349	5501	2341	3583	5240	7107
	24	1776*	2686	3805	4905	1947	3103	4651	6409
14	12	1815	2615	3569	4534	2048	3095	4410	5831
	16	1574*	2345	3272	4208	1801	2800	4071	5457
	24	1163†	1884*	2762	3648	1385*	2304	3495	4811
16	12	1319*	1953*	2698	3463	1567*	2392	3395	4466
	16	1095†	1705*	2431*	3174	1326*	2114*	3090	4139
	24	705†	1274†	1961*	2664*	919†	1639*	2557*	3557*
18	12	951†	1459*	2051*	2663	1176*	1831*	2618	3452
	16	740†	1229†	1807*	2401*	946†	1573*	2339*	3157*
	24	368†	821†	1367†	1928†	554†	1123†	1843†	2621*
20	12	677†	1090†	1571†	2069*	870†	1400†	2031*	2700*
	16	475†	872†	1341†	1824†	651†	1156†	1772†	2426*
	24	116+	481+	924†	1377†	272+	727†	1303†	1922†

Height (ft)	Spacing (in o.c.)	60 SJ (6")				725 SJ (7 1/4")			80 SJ (8")		
		20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
8	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
9	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
10	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
11	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
12	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
14	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	3132	4875	6979	9436	4634	6849	9715	4520	7168	10813
16	12	3400	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3110	4780	6974	9436	4634	6849	9715	4520	7168	10813
	24	2602	4167	6231	8649	4634	6849	9715	4520	7168	10813
18	12	2947	4487	6459	8699	4634	6849	9715	4520	7168	10813
	16	2620	4091	5985	8144	4634	6849	9715	4520	7168	10813
	24	2066	3424	5189	7213	4247	6634	9603	4520	7168	10813
20	12	2478	3805	5462	7297	4634	6849	9715	4520	7168	10813
	16	2140	3403	4997	6775	4332	6637	9439	4520	7168	10813
	24	1572*	2728*	4212	5883	3695	5836	8434	4088	6790	10293

Allowable axial loads based on SJ members with 40 ksi yield strength (Fy). Contact Unimast Technical Department for information on 33 ksi and 50 ksi members. Deflection limitations are shown by loads in black ink only for L/360; * for L/240; † for L/120; and + for greater than L/120. Axial loads are based on mechanical bracing installed 48" o.c. maximum. See Design Considerations, page 39.

Table 26

15 psf

SJ (3 5/8", 4")

SJ Studs: Allowable Axial Loads

Exterior Wall

Height (ft.)	Spacing (in o.c.)	362 SJ (3 5/8")				40 SJ (4")					
		20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge		
8	12	2873	4015	5164	6118	2722	3929	5650	7708		
	16	2527	3669	5106	6118	2462	3883	5650	7708		
	24	1910	3013	4395	5659	1971	3307	5198	7455		
9	12	2457	3569	4967	6117	2436	3826	5649	7707		
	16	2059	3139	4492	5743	2114	3443	5310	7525		
	24	1372*	2388	3661	4866	1536	2755	4472	6512		
10	12	2028	3066	4363	5583	2115	3406	5200	7306		
	16	1601*	2592	3832	5015	1747	2963	4655	6645		
	24	877*	1786*	2928	4041	1104*	2189	3712	5509		
11	12	1620*	2563	3737	4875	1782	2956	4566	6432		
	16	1180*	2070*	3181	4269	1382*	2472	3975	5723		
	24	442†	1239*	2244*	3247*	698†	1647*	2974	4527		
12	12	1252*	2095*	3140	4174	1456*	2507	3929	5554		
	16	810†	1597*	2578*	3558	1038*	2002*	3318	4833		
	24		761†	1636†	2525*	332†	1149†	2293*	3624*		
14	12	653†	1312†	2124*	2948*	877†	1696*	2782*	3999		
	16	220†	824†	1580†	2351*	448†	1182†	2178*	3305*		
	24			659†	1340†		321†	1161†	2129†		
16	12	214†	727†	1360†	2009†	417†	1049†	1882†	2805*		
	16		256†	839†	1440†		547†	1302†	2148†		
	24				466†			313†	1019†		
18	12		295 +	795†	1310†		554†	1203†	1915†		
	16			294 +	765†			644†	1290†		
	24								202†		
20	12			373 +	786†		177 +	689†	1249†		
	16				260 +			149 +	648†		
	24										
Height (ft)	Spacing (in o.c.)	60 SJ (6")				725 SJ (7 1/4")			80 SJ (8")		
		20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
8	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
9	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	3177	4957	6979	9436	4634	6849	9715	4520	7168	10813
10	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3368	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	2817	4603	6979	9436	4634	6849	9715	4520	7168	10813
11	12	3423	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3076	4880	6979	9436	4634	6849	9715	4520	7168	10813
	24	2427	4133	6436	9208	4541	6849	9715	4520	7168	10813
12	12	3161	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	2757	4489	6817	9436	4634	6849	9715	4520	7168	10813
	24	2020	3629	5807	8420	4198	6767	9715	4410	7168	10813
14	12	2573	4212	6403	9013	4634	6849	9715	4520	7168	10813
	16	2076	3621	5697	8167	4249	6780	9715	4474	7168	10813
	24	1205*	2585	4463	6698	3427	5782	8768	3773	6620	10495
16	12	1959	3394	5301	7536	4140	6583	9664	4407	7168	10813
	16	1405*	2730	4506	6591	3587	5902	8811	3933	6762	10574
	24	461†	1599*	3159*	4997	2594	4682	7298	3054	5613	9055
18	12	1382*	2603*	4214	6071	3523	5731	8466	3903	6641	10273
	16	803†	1909*	3391*	5109	2882	4937	7479	3329	5882	9262
	24		744†	2011*	3494*	1765*	3564	5786	2297	4533	7495
20	12	878†	1901*	3246*	4775*	2886	4831	7191	3352	5806	8985
	16	292†	1204†	2428*	3833*	2188*	3971	6138	2697	4946	7861
	24			1054†	2242†	997†	2513*	4363*	1552*	3460*	5948

Allowable axial loads based on SJ members with 40 ksi yield strength (Fy). Contact Unimast Technical Department for information on 33 ksi and 50 ksi members. Deflection limitations are shown by loads in black ink only for L/360; for * L/240; † for L/120; and + for greater than L/120. Axial loads are based on mechanical bracing installed 48" o.c. maximum. See Design Considerations, page 39.

SJ (6", 7 1/4", 8")

SJ (3 5/8", 4")



Table 27

20 psf

SJ Studs: Allowable Axial Loads (lbs)

Exterior Wall

Height (ft)	Spacing (in o.c.)	362 SJ (3 5/8")				40 SJ (4")			
		20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge
8	12	2527	3669	5106	6118	2462	3883	5650	7708
	16	2106	3223	4623	5895	2129	3493	5422	7708
	24	1365*	2427	3755	4993	1520	2777	4561	6692
9	12	2059	3139	4492	5743	2114	3443	5310	7525
	16	1588	2625	3924	5144	1720	2975	4739	6834
	24	781*	1737*	2937	4094	1021*	2141	3728	5618
10	12	1601*	2592	3832	5015	1747	2963	4655	6645
	16	1103*	2038*	3211	4347	1307*	2434	4009	5866
	24	262†	1099*	2156*	3206	545†	1518*	2899	4535
11	12	1180*	2070*	3181	4269	1382*	2472	3975	5723
	16	672†	1498*	2536*	3566	913*	1905*	3287	4901
	24		538†	1454†	2384*	113†	942†	2123*	3516*
12	12	810†	1597*	2578*	3558	1038*	2002*	3318	4833
	16	300†	1022†	1930*	2847*	552†	1415*	2613*	4001
	24			842†	1654†		429†	1429†	2604*
14	12	220†	824†	1580†	2351*	448†	1182†	2178*	3305*
	16		259†	947†	1656†		590†	1478†	2497*
	24				483†			300†	1129†
16	12		256†	839†	1440†		547†	1302†	2148†
	16			227†	772†			623†	1374†
	24								
18	12			294 +	765†			644†	1290†
	16				119 +				545†
	24								
20	12				260 +			149 +	648†
	16								
	24								

SJ (6", 7 1/4", 8")



Height (ft)	Spacing (in o.c.)	60 SJ (6")				725 SJ (7 1/4")			80 SJ (8")		
		20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
8	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	3150	4957	6979	9436	4634	6849	9715	4520	7168	10813
9	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3325	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	2743	4537	6956	9436	4634	6849	9715	4520	7168	10813
10	12	3368	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	2997	4807	6979	9436	4634	6849	9715	4520	7168	10813
	24	2298	4010	6326	9116	4429	6849	9715	4520	7168	10813
11	12	3076	4880	6979	9436	4634	6849	9715	4520	7168	10813
	16	2637	4375	6718	9436	4634	6849	9715	4520	7168	10813
	24	1829	3441	5630	8262	4034	6593	9715	4263	7168	10813
12	12	2757	4489	6817	9436	4634	6849	9715	4520	7168	10813
	16	2256	3905	6132	8805	4402	6849	9715	4520	7168	10813
	24	1354	2850	4890	7338	3603	6057	9186	3906	6845	10813
14	12	2076	3621	5697	8167	4249	6780	9715	4474	7168	10813
	16	1480*	2913	4853	7161	3693	6105	9166	4002	6916	10813
	24	446†	1683*	3391	5427	2669	4863	7636	3110	5765	9377
16	12	1405*	2730	4506	6591	3587	5902	8811	3933	6762	10574
	16	757†	1953*	3580	5494	2911	5071	7779	3338	5983	9542
	24		637†	2015*	3647*	1708*	3599	5965	2247	4567	7690
18	12	803†	1909*	3391*	5109	2882	4937	7479	3329	5882	9262
	16	133†	1107†	2441*	3997*	2118*	3996	6317	2627	4962	8053
	24			848†	2132†	796†	2378*	4335*	1378*	3344	5958
20	12	292†	1204†	2428*	3833*	2188*	3971	6138	2697	4946	7861
	16		398†	1483†	2739†	1370*	2969*	4917	1914*	3927	6547
	24				894†		1275†	2862*	556†	2180*	4318*

Allowable axial loads based on SJ members with 40 ksi yield strength (Fy). Contact Unimast Technical Department for information on 33 ksi and 50 ksi members. Deflection limitations are shown by loads in black ink only for L/360; *for L/240; † for L/120; and + for greater than L/120. Axial loads are based on mechanical bracing installed 48" o.c. maximum. See Design Considerations, page 39.

Table 28

25 psf

SJ (3 5/8", 4")

SJ Studs: Allowable Axial Loads (lbs)

Exterior Wall

Height (ft)	Spacing (in o.c.)	362 SJ (3 5/8")				40 SJ (4")			
		20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge
8	12	2208	3331	4740	6015	2210	3588	5537	7708
	16	1722	2811	4175	5431	1816	3126	4980	7193
	24	871*	1891	3167	4376	1101	2284	3968	5984
9	12	1701	2748	4061	5288	1816	3088	4877	7001
	16	1167*	2162	3410	4599	1358	2543	4215	6203
	24	254†	1153*	2286*	3397	552*	1581*	3052	4809
10	12	1221*	2170	3359	4506	1412*	2560	4164	6052
	16	662†	1546	2659	3750	910*	1956	3429	5170
	24		491†	1472*	2463*		916*	2172*	3667
11	12	793†	1634*	2689*	3733	1025*	2040*	3451	5096
	16	224†	994†	1968*	2946*	494†	1401*	2677*	4174
	24			756†	1621†		317†	1370*	2624*
12	12	421†	1158†	2084*	3016*	688†	1555*	2780*	4198
	16		515†	1359†	2221*	123†	898†	1991*	3267*
	24			143†	887†			666†	1706†
14	12		393†	1097†	1821†		730†	1644†	2689*
	16			386†	1041†			860†	1780†
	24								244†
16	12			373†	931†		102†	784†	1559†
	16				175†				682†
	24								
18	12				274 +			143 +	724†
	16								
	24								
20	12								
	16								
	24								

Height (ft)	Spacing (in o.c.)	60 SJ (6")				725 SJ (6")			80 SJ (8")		
		20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
8	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3380	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	2811	4629	6979	9436	4634	6849	9715	4520	7168	10813
9	12	3400	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3030	4861	6979	9436	4634	6849	9715	4520	7168	10813
	24	2326	4065	6417	9254	4448	6849	9715	4520	7168	10813
10	12	3088	4911	6979	9436	4634	6849	9715	4520	7168	10813
	16	2641	4402	6777	9436	4634	6849	9715	4520	7168	10813
	24	1806	3446	5674	8358	4017	6592	9715	4241	7168	10813
11	12	2744	4499	6861	9436	4634	6849	9715	4520	7168	10813
	16	2223	3897	6161	8885	4370	6849	9715	4520	7168	10813
	24	1272	2793	4874	7375	3543	6011	9163	3847	6792	10813
12	12	2378	4047	6298	9002	4505	6849	9715	4520	7168	10813
	16	1791	3361	5492	8048	3996	6527	9715	4240	7168	10813
	24	743*	2132	4046	6342	3035	5376	8357	3418	6222	10067
14	12	1623*	3082	5055	7402	3829	6270	9370	4118	7066	10813
	16	942*	2272*	4091	6257	3168	5468	8380	3548	6329	10114
	24		873*	2430*	4291	1963	4007	6587	2480	4956	8325
16	12	911*	2138*	3800	5755	3075	5271	8027	3483	6172	9792
	16	181†	1263*	2759*	4525*	2288	4308	6837	2778	5254	8585
	24			1003†	2456*	901*	2616*	4760	1498*	3601	6440
18	12	292†	1297†	2667*	4260*	2301*	4221	6594	2797	5183	8343
	16		400†	1604†	3017*	1429*	3152*	5280	1980*	4122	6961
	24				932†		1320*	3046*	541*	2268*	4580
20	12		589†	1707†	2998*	1565*	3207*	5206	2102*	4170	6859
	16			649†	1771†	642†	2081*	3838*	1206*	3014*	5379
	24							1537†		1039†	2875*

Allowable axial loads based on SJ members with 40 ksi yield strength (Fy). Contact Unimast Technical Department for information on 33 ksi and 50 ksi members. Deflection limitations are shown by loads in black ink only for L/360; for * L/240; † for L/120; and + for greater than L/120. Axial loads are based on mechanical bracing installed 48" o.c. maximum. See Design Considerations, page 39.

SJ (6", 7 1/4", 8")

SJ (3 5/8", 4")



SJ (6", 7 1/4", 8")



Table 29

30 psf

SJ Studs: Allowable Axial Loads (lbs)

Exterior Wall

Height (ft)	Spacing (in o.c.)	362 SJ (3 5/8")				40 SJ (4")			
		20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge
8	12	1910	3013	4395	5659	1971	3307	5198	7455
	16	1365*	2427	3755	4993	1520	2777	4561	6692
	24	417*	1395*	2621	3800	709*	1820	3411	5320
9	12	1372*	2388	3661	4866	1536	2755	4472	6512
	16	781*	1737*	2937	4094	1021*	2141	3728	5618
	24		620*	1690*	2757*	119†	1064*	2429	4065
10	12	877*	1786*	2928	4041	1104*	2189	3712	5509
	16	262†	1099*	2156*	3206	545†	1518*	2899	4535
	24			851†	1788*		367†	1509*	2878*
11	12	442†	1239*	2244*	3247*	698†	1647*	2974	4527
	16		538†	1454†	2384*	113†	942†	2123*	3516*
	24			125†	931†			688†	1816*
12	12		761†	1636†	2525*	332†	1149†	2293*	3624*
	16			842†	1654†		429†	1429†	2604*
	24				193†				894†
14	12			659†	1340†		321†	1161†	2129†
	16				483†			300†	1129†
	24								
16	12				466†			313†	1019†
	16								
	24								
18	12								202†
	16								
	24								
20	12								
	16								
	24								

Height (ft)	Spacing (in o.c.)	60 SJ (6")				725 SJ (7 1/4")			80 SJ (8")		
		20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
8	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3150	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	2480	4258	6660	9436	4568	6849	9715	4520	7168	10813
9	12	3177	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	2743	4537	6956	9436	4634	6849	9715	4520	7168	10813
	24	1923	3608	5894	8649	4117	6727	9715	4319	7168	10813
10	12	2817	4603	6979	9436	4634	6849	9715	4520	7168	10813
	16	2298	4010	6326	9116	4429	6849	9715	4520	7168	10813
	24	1337	2906	5050	7631	3614	6117	9320	3900	6879	10813
11	12	2427	4133	6436	9208	4541	6849	9715	4520	7168	10813
	16	1829	3441	5630	8262	4034	6593	9715	4263	7168	10813
	24	747*	2182	4160	6538	3067	5445	8478	3439	6276	10175
12	12	2020	3629	5807	8420	4198	6767	9715	4410	7168	10813
	16	1354	2850	4890	7338	3603	6057	9186	3906	6845	10813
	24	175*	1464*	3259	5415	2489	4723	7562	2942	5618	9287
14	12	1205*	2585	4463	6698	3427	5782	8768	3773	6620	10495
	16	446†	1683*	3391	5427	2669	4863	7636	3110	5765	9377
	24		132†	1551*	3253*	1298*	3203	5603	1879	4185	7328
16	12	461†	1599*	3159*	4997	2594	4682	7298	3054	5613	9055
	16		637†	2015*	3647*	1708*	3599	5965	2247	4567	7690
	24				1377†	155†	1709*	3652*	795*	2699	5279
18	12		744†	2011*	3494*	1765*	3564	5786	2297	4533	7495
	16			848†	2132†	796†	2378*	4335*	1378*	3344	5958
	24						354†	1873*		1279*	3320*
20	12			1054†	2242†	997†	2513*	4363*	1552*	3460*	5948
	16				894†		1275†	2862*	556†	2180*	4318*
	24							339†			1565†

Allowable axial loads based on SJ members with 40 ksi yield strength (F_y). Contact Unimast Technical Department for information on 33 ksi and 50 ksi members. Deflection limitations are shown by loads in black ink only for L/360; * for L/240; † for L/120; and + for greater than L/120. Axial loads are based on mechanical bracing installed 48" o.c. maximum. See Design Considerations, page 39.

Table 30

35 psf

SJ (3 5/8", 4")

SJ Studs: Allowable Axial Loads (lbs) **Exterior Wall**

Height (ft)	Spacing (in o.c.)	362 SJ (3 5/8")				40 SJ (4")			
		20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge
8	12	1630	2713	4068	5319	1741	3037	4873	7066
	16	1031*	2065	3358	4577	1238	2444	4161	6214
	24		931*	2108	3256	338*	1381*	2885	4694
9	12	1067*	2052	3288	4469	1271	2440	4090	6053
	16	424†	1341*	2496	3623	704*	1762	3271	5071
	24		125†	1137*	2161*		581*	1847*	3372
10	12	559†	1431*	2529*	3610	816*	1843*	3293	5006
	16		686†	1692*	2702*	206†	1111*	2406*	3947
	24			279†	1164†			896*	2150*
11	12	119†	876†	1835*	2800*	396†	1283*	2534*	4004
	16		118†	980†	1866*		518†	1612*	2910*
	24				296†				1072†
12	12		396†	1225†	2074*		776†	1845*	3096*
	16			368†	1134†			911†	1995†
	24								148†
14	12			254†	897†			715†	1611†
	16								529†
	24								
16	12								518†
	16								
	24								
18	12								
	16								
	24								
20	12								
	16								
	24								

Height (ft)	Spacing (in o.c.)	60 SJ (6")				72.5 SJ (7 1/4")				80 SJ (8")			
		20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge		18 gauge	16 gauge	14 gauge	
8	12	3322	4957	6979	9436	4634	6849	9715		4520	7168	10813	
	16	2923	4754	6979	9436	4634	6849	9715		4520	7168	10813	
	24	2157	3895	6249	9087	4308	6849	9715		4473	7168	10813	
9	12	2958	4779	6979	9436	4634	6849	9715		4520	7168	10813	
	16	2463	4220	6595	9436	4559	6849	9715		4520	7168	10813	
	24	1533	3164	5386	8062	3791	6345	9617		4044	7076	10813	
10	12	2554	4303	6663	9436	4634	6849	9715		4520	7168	10813	
	16	1967	3631	5888	8607	4153	6753	9715		4356	7168	10813	
	24	888	2388	4451	6932	3219	5652	8760		3564	6456	10438	
11	12	2123	3781	6026	8727	4285	6849	9715		4475	7168	10813	
	16	1454	3005	5121	7665	3705	6203	9396		3985	6967	10813	
	24	251*	1602	3482	5742	2605	4895	7813		3039	5770	9526	
12	12	1679	3231	5338	7867	3897	6408	9614		4156	7164	10813	
	16	942*	2365	4321	6666	3222	5600	8629		3579	6428	10333	
	24		836*	2520	4544	1963	4093	6797		2480	5030	8530	
14	12	814*	2121*	3911	6043	3041	5314	8191		3437	6186	9927	
	16		1135*	2740*	4657	2193	4286	6929		2687	5221	8669	
	24			737†	2293*	669*	2441	4674		1303	3448	6379	
16	12		1102†	2567*	4298*	2139	4126	6613		2642	5079	8356	
	16			1328†	2839*	1162*	2934	5149		1742	3916	6845	
	24			385†			862*	2621*		131*	1850*	4192	
18	12		234†	1409†	2788*	1266*	2952*	5036		1826*	3922	6703	
	16			152†	1317†	207†	1661*	3461*		812*	2616*	5025	
	24							790†			358†	2152*	
20	12			454†	1544†	471†	1873*	3586*		1039*	2799*	5105	
	16						532†	1963†			1407*	3339*	
	24											358†	

Allowable axial loads based on SJ members with 40 ksi yield strength (Fy). Contact Unimast Technical Department for information on 33 ksi and 50 ksi members. Deflection limitations are shown by loads in black ink only for L/360; for * L/240; † for L/120; and + for greater than L/120. Axial loads are based on mechanical bracing installed 48" o.c. maximum. See Design Considerations, page 39.

SJ (6", 7 1/4", 8")

SJ (3 5/8", 4")



Table 31

40 psf

SJ Studs: Allowable Axial Loads (lbs)

Exterior Wall

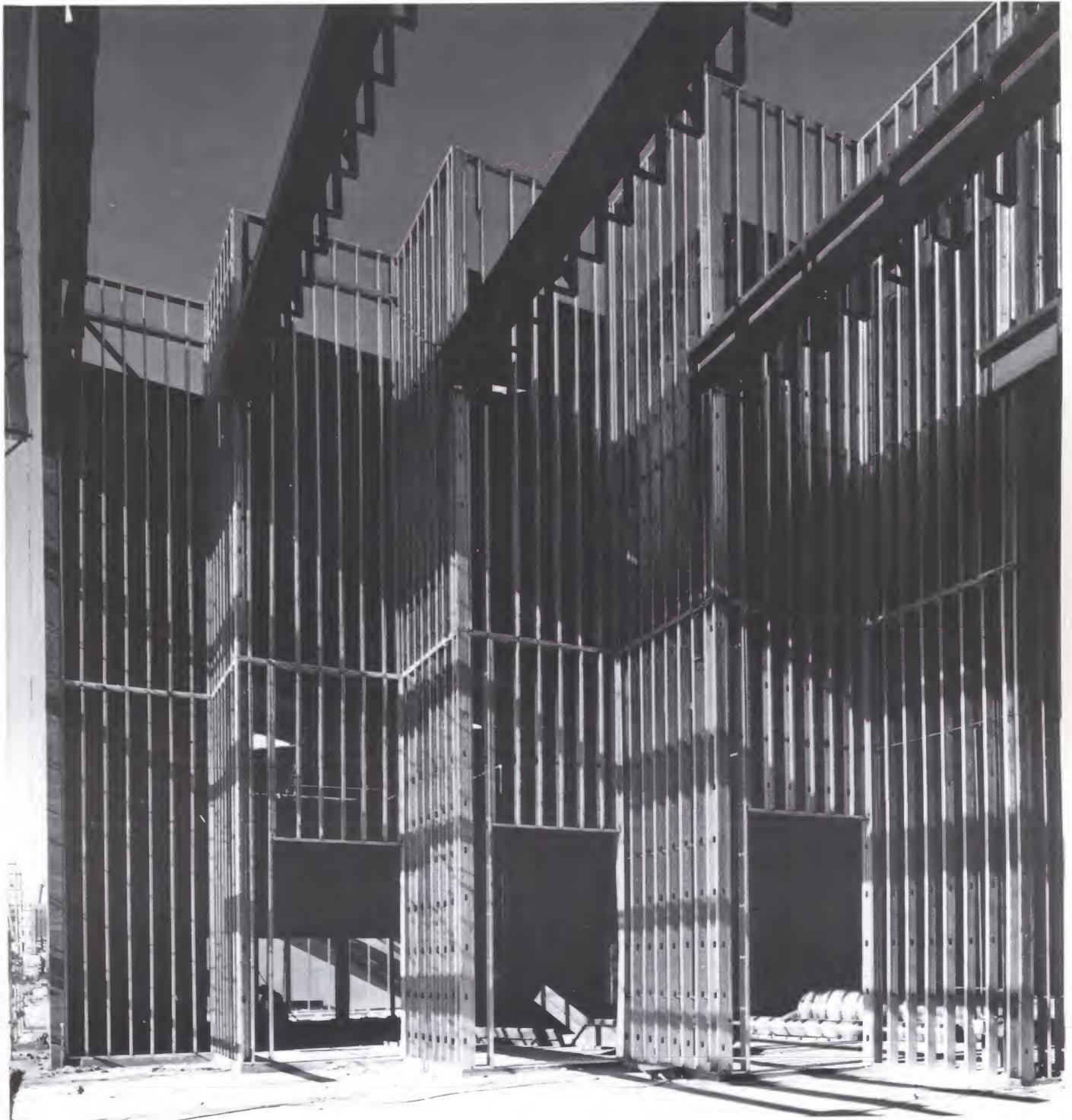
Height (ft)	Spacing (in o.c.)	362 SJ (3 5/8")				40 SJ (4")			
		20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge
8	12	1365*	2427	3755	4993	1520	2777	4561	6692
	16	716*	1722	2981	4180	968*	2126	3778	5758
	24		494*	1623*	2741		963*	2384	4098
9	12	781*	1737*	2937	4094	1021*	2141	3728	5618
	16		970*	2082*	3178	404*	1405*	2839	4555
	24			619†	1602*		126†	1300*	2721*
10	12	262†	1099*	2156*	3206	545†	1518*	2899	4535
	16		301†	1259*	2232*		728*	1945*	3397*
	24			582†				322†	1469*
11	12		538†	1454†	2384*	113†	942†	2123*	3516*
	16			540†	1384†		122†	1136†	2346*
	24								380†
12	12			842†	1654†		429†	1429†	2604*
	16				649†			429†	1427†
	24								
14	12				483†			300†	1129†
	16								
	24								
16	12								
	16								
	24								
18	12								
	16								
	24								
20	12								
	16								
	24								

SJ (6", 7 1/4", 8")



Height (ft)	Spacing (in o.c.)	60 SJ (6")				725 SJ (7 1/4")			80 SJ (8")		
		20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
8	12	3150	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	2700	4505	6939	9436	4634	6849	9715	4520	7168	10813
	24	1840	3539	5845	8623	4051	6663	9715	4257	7168	10813
9	12	2743	4537	6956	9436	4634	6849	9715	4520	7168	10813
	16	2190	3911	6241	9050	4337	6849	9715	4504	7168	10813
	24	1155	2732	4891	7489	3470	5968	9166	3771	6735	10813
10	12	2298	4010	6326	9116	4429	6849	9715	4520	7168	10813
	16	1647	3263	5463	8112	3882	6433	9700	4127	7165	10813
	24	457*	1890	3873	6258	2832	5195	8210	3232	6039	9905
11	12	1829	3441	5630	8262	4034	6593	9715	4263	7168	10813
	16	1093	2586	4632	7091	3383	5820	8932	3710	6619	10615
	24		1049*	2835	4983	2155	4360	7165	2647	5275	8890
12	12	1354	2850	4890	7338	3603	6057	9186	3906	6845	10813
	16	550*	1905	3778	6026	2851	5156	8089	3258	6019	9804
	24		241*	1820*	3720	1455	3485	6058	2029	4458	7795
14	12	446†	1683*	3391	5427	2669	4863	7636	3110	5765	9377
	16		619*	2129*	3935*	1737	3734	6252	2277	4695	7987
	24				1394*		1717*	3792	748*	2740	5471
16	12		637†	2015*	3647*	1708*	3599	5965	2247	4567	7690
	16			688†	2085*	646*	2306*	4381	1259*	3294	6044
	24							1652*		1045*	3165*
18	12			848†	2132†	796†	2378*	4335*	1378*	3344	5958
	16				559†		989†	2643*	277†	1930*	4149*
	24										1058*
20	12				894†		1275†	2862*	556†	2180*	4318*
	16							1126†		683†	2425*
	24										

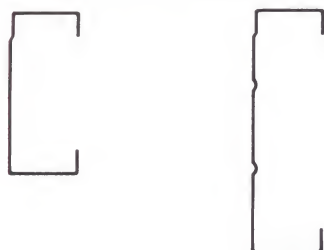
Allowable axial loads based on SJ members with 40 ksi yield strength (F_y). Contact Unimast Technical Department for information on 33 ksi and 50 ksi members. Deflection limitations are shown by loads in black ink only for L/360; * for L/240; † for L/120; and + for greater than L/120. Axial loads are based on mechanical bracing installed 48" o.c. maximum. See Design Considerations, page 39.



Unimast makes SJ, SN, CW and ST20 studs for curtain wall applications.

SJ (3 5/8", 4")

SJ (6", 7 1/4", 8")



Studs used in curtain wall systems provide support for the exterior and interior wall materials and resist wind (lateral) loads. The tables in this section provide information on limiting heights and sizing recommendations for lateral loaded studs only and do not apply to axial load bearing studs. See pages 17-24 for axial load bearing information.

Unimast SJ studs are manufactured for structural applications and offer additional

strength for curtain wall applications. In addition, Unimast has SN studs for curtain wall applications available in 20, 18, 16 and 14-gauge steel and three standard depths. More economical CW studs are available in 20, 18, 16 and 14-gauge steel and 3 5/8", 6" and 8" depths. 20-gauge ST studs may also be used under certain conditions for curtain walls. The following table identifies limiting heights for curtain wall applications.

Table 32a

SJ Studs: Curtain Wall Limiting Heights

Stud Properties Only

Wind load	Deflection limitation	Stud spacing (in o.c.)	362 SJ (3 5/8")				40 SJ (4")			
			20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge
15 psf	L/240	12	13'4"	14'7"	15'9"	16'10"	14'4"	15'8"	16'11"	18'2"
		16	12'1"	13'3"	14'4"	15'4"	13'0"	14'3"	15'5"	16'6"
		24	10'7"	11'7"	12'6"	13'4"	11'4"	12'5"	13'5"	14'5"
	L/360	12	11'8"	12'9"	13'9"	14'9"	12'6"	13'8"	14'10"	15'10"
		16	10'7"	11'7"	12'6"	13'4"	11'4"	12'5"	13'5"	14'5"
		24	9'3"	10'1"	10'11"	11'8"	9'11"	10'10"	11'9"	12'7"
	L/600	12	9'10"	10'9"	11'7"	12'5"	10'7"	11'7"	12'6"	13'4"
		16	8'11"	9'9"	10'6"	11'3"	9'7"	10'6"	11'4"	12'2"
		24	7'9"	8'6"	9'2"	9'10"	8'5"	9'2"	9'11"	10'7"
20 psf	L/240	12	12'1"	13'3"	14'4"	15'4"	13'0"	14'3"	15'5"	16'6"
		16	11'0"	12'0"	13'0"	13'11"	11'10"	12'11"	14'0"	15'0"
		24	9'7"	10'6"	11'4"	12'2"	10'4"	11'4"	12'3"	13'1"
	L/360	12	10'7"	11'7"	12'6"	13'4"	11'4"	12'5"	13'5"	14'5"
		16	9'7"	10'6"	11'4"	12'2"	10'4"	11'4"	12'3"	13'1"
		24	8'5"	9'2"	9'11"	10'7"	9'0"	9'11"	10'8"	11'5"
	L/600	12	8'11"	9'9"	10'6"	11'3"	9'7"	10'6"	11'4"	12'2"
		16	8'1"	8'10"	9'7"	10'3"	8'9"	9'6"	10'4"	11'0"
		24	7'1"	7'9"	8'4"	8'11"	7'7"	8'4"	9'0"	9'8"
25 psf	L/240	12	11'3"	12'3"	13'3"	14'2"	12'1"	13'3"	14'4"	15'4"
		16	10'2"	11'2"	12'1"	12'11"	11'0"	12'0"	13'0"	13'11"
		24	8'11"	9'9"	10'6"	11'3"	9'7"	10'6"	11'4"	12'2"
	L/360	12	9'10"	10'9"	11'7"	12'5"	10'7"	11'7"	12'6"	13'4"
		16	8'11"	9'9"	10'6"	11'3"	9'7"	10'6"	11'4"	12'2"
		24	7'9"	8'6"	9'2"	9'10"	8'5"	9'2"	9'11"	10'7"
	L/600	12	8'3"	9'1"	9'9"	10'6"	8'11"	9'9"	10'6"	11'3"
		16	7'6"	8'3"	8'11"	9'6"	8'1"	8'10"	9'7"	10'3"
		24	6'7"	7'2"	7'9"	8'4"	7'1"	7'9"	8'4"	8'11"
30 psf	L/240	12	10'7"	11'7"	12'6"	13'4"	11'4"	12'5"	13'5"	14'5"
		16	9'7"	10'6"	11'4"	12'2"	10'4"	11'4"	12'3"	13'1"
		24	8'5"	9'2"	9'11"	10'7"	9'0"	9'11"	10'8"	11'5"
	L/360	12	9'3"	10'1"	10'11"	11'8"	9'11"	10'10"	11'9"	12'7"
		16	8'5"	9'2"	9'11"	10'7"	9'0"	9'11"	10'8"	11'5"
		24	7'4"	8'0"	8'8"	9'3"	7'11"	8'8"	9'4"	10'0"
	L/600	12	7'9"	8'6"	9'2"	9'10"	8'5"	9'2"	9'11"	10'7"
		16	7'1"	7'9"	8'4"	8'11"	7'7"	8'4"	9'0"	9'8"
		24	6'2"	6'9"	7'4"	7'10"	6'8"	7'3"	7'10"	8'5"
35 psf	L/240	12	10'1"	11'0"	11'10"	12'8"	10'10"	11'10"	12'9"	13'8"
		16	9'1"	10'0"	10'9"	11'6"	9'10"	10'9"	11'7"	12'5"
		24	8'0"	8'9"	9'5"	10'1"	8'7"	9'5"	10'2"	10'10"
	L/360	12	8'9"	9'7"	10'4"	11'1"	9'5"	10'4"	11'2"	11'11"
		16	8'0"	8'9"	9'5"	10'1"	8'7"	9'5"	10'2"	10'10"
		24	7'0"	7'7"	8'3"	8'10"	7'6"	8'2"	8'10"	9'6"
	L/600	12	7'5"	8'1"	8'9"	9'4"	8'0"	8'9"	9'5"	10'1"
		16	6'9"	7'4"	7'11"	8'6"	7'3"	7'11"	8'7"	9'2"
		24	5'10"	6'5"	6'11"	7'5"	6'4"	6'11"	7'6"	8'0"
40 psf	L/240	12	9'7"	10'6"	11'4"	12'2"	10'4"	11'4"	12'3"	13'1"
		16	8'9"	9'7"	10'4"	11'0"	9'5"	10'3"	11'1"	11'11"
		24	7'7"	8'4"	9'0"	9'8"	8'2"	9'0"	9'8"	10'5"
	L/360	12	8'5"	9'2"	9'11"	10'7"	9'0"	9'11"	10'8"	11'5"
		16	7'7"	8'4"	9'0"	9'8"	8'2"	9'0"	9'8"	10'5"
		24	6'8"	7'3"	7'10"	8'5"	7'2"	7'10"	8'6"	9'1"
	L/600	12	7'1"	7'9"	8'4"	8'11"	7'7"	8'4"	9'0"	9'8"
		16	6'5"	7'0"	7'7"	8'2"	6'11"	7'7"	8'2"	8'9"
		24	5'7"	6'2"	6'8"	7'1"	6'1"	6'7"	7'2"	7'8"

Limiting heights are for SJ members with 40 ksi yield strength (Fy) and based on lateral bracing provided by mechanically fastened gypsum board or sheathing each side based on the properties of the studs alone with a 33% increase for wind loading. Contact Unimast Technical Department for information on 33 ksi and 50 ksi members. See Design Considerations, page 39.



Steel framing is superior for modern construction designs.

Table 32b

SJ Studs: Curtain Wall Limiting Heights

Stud Properties Only

Wind load	Deflection limitation	Stud spacing (in o.c.)	60 SJ (6")				725 SJ (7 1/4")			80 SJ (8")		
			20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
15 psf	L/240	12	19'10"	21'9"	23'7"	25'3"	25'4"	27'6"	29'6"	27'6"	29'10"	32'0"
		16	18'0"	19'9"	21'5"	22'11"	23'0"	25'0"	26'9"	25'0"	27'1"	29'1"
		24	15'9"	17'3"	18'8"	20'0"	20'2"	21'10"	23'5"	21'10"	23'8"	25'4"
	L/360	12	17'4"	19'0"	20'7"	22'1"	22'2"	24'0"	25'9"	24'0"	26'0"	27'11"
		16	15'9"	17'3"	18'8"	20'0"	20'2"	21'10"	23'5"	21'10"	23'8"	25'4"
		24	13'9"	15'1"	16'4"	17'6"	17'7"	19'1"	20'5"	19'1"	20'8"	22'2"
	L/600	12	14'7"	16'0"	17'4"	18'7"	18'8"	20'3"	21'9"	20'3"	22'0"	23'7"
		16	13'3"	14'7"	15'9"	16'11"	17'0"	18'5"	19'9"	18'5"	19'11"	21'5"
		24	11'7"	12'9"	13'9"	14'9"	14'10"	16'1"	17'3"	16'1"	17'5"	18'8"
20 psf	L/240	12	18'0"	19'9"	21'5"	22'11"	23'0"	25'0"	26'9"	25'0"	27'1"	29'1"
		16	16'5"	17'11"	19'5"	20'10"	20'11"	22'8"	24'4"	22'8"	24'7"	26'5"
		24	14'4"	15'8"	17'0"	18'2"	18'3"	19'10"	21'3"	19'10"	21'6"	23'1"
	L/360	12	15'9"	17'3"	18'8"	20'0"	20'2"	21'10"	23'5"	21'10"	23'8"	25'4"
		16	14'4"	15'8"	17'0"	18'2"	18'3"	19'10"	21'3"	19'10"	21'6"	23'1"
		24	12'6"	13'8"	14'10"	15'11"	16'0"	17'4"	18'7"	17'4"	18'9"	20'2"
	L/600	12	13'3"	14'7"	15'9"	16'11"	17'0"	18'5"	19'9"	18'5"	19'11"	21'5"
		16	12'1"	13'3"	14'4"	15'4"	15'5"	16'9"	17'11"	16'9"	18'2"	19'5"
		24	10'7"	11'7"	12'6"	13'5"	13'6"	14'7"	15'8"	14'7"	15'10"	17'0"
25 psf	L/240	12	16'9"	18'4"	19'10"	21'3"	21'5"	23'2"	24'10"	23'2"	25'2"	27'0"
		16	15'2"	16'8"	18'1"	19'4"	19'5"	21'1"	22'7"	21'1"	22'10"	24'6"
		24	13'3"	14'7"	15'9"	16'11"	17'0"	18'5"	19'9"	18'5"	19'11"	21'5"
	L/360	12	14'7"	16'0"	17'4"	18'7"	18'8"	20'3"	21'9"	20'3"	22'0"	23'7"
		16	13'3"	14'7"	15'9"	16'11"	17'0"	18'5"	19'9"	18'5"	19'11"	21'5"
		24	11'7"	12'9"	13'9"	14'9"	14'10"	16'1"	17'3"	16'1"	17'5"	18'8"
	L/600	12	12'4"	13'6"	14'8"	15'8"	15'9"	17'1"	18'4"	17'1"	18'6"	19'10"
		16	11'2"	12'3"	13'4"	14'3"	14'4"	15'6"	16'8"	15'6"	16'10"	18'1"
		24	9'9"	10'9"	11'7"	12'5"	12'6"	13'7"	14'6"	13'7"	14'8"	15'9"
30 psf	L/240	12	15'9"	17'3"	18'8"	20'0"	20'2"	21'10"	23'5"	21'10"	23'8"	25'4"
		16	14'4"	15'8"	17'0"	18'2"	18'3"	19'10"	21'3"	19'10"	21'6"	23'1"
		24	12'6"	13'8"	14'10"	15'11"	16'0"	17'4"	18'7"	17'4"	18'9"	20'2"
	L/360	12	13'9"	15'1"	16'4"	17'6"	17'7"	19'1"	20'5"	19'1"	20'8"	22'2"
		16	12'6"	13'8"	14'10"	15'11"	16'0"	17'4"	18'7"	17'4"	18'9"	20'2"
		24	10'11"	12'0"	13'0"	13'11"	13'11"	15'2"	16'3"	15'2"	16'5"	17'7"
	L/600	12	11'7"	12'9"	13'9"	14'9"	14'10"	16'1"	17'3"	16'1"	17'5"	18'8"
		16	10'7"	11'7"	12'6"	13'5"	13'6"	14'7"	15'8"	14'7"	15'10"	17'0"
		24	9'3"	10'1"	10'11"	11'9"	11'9"	12'9"	13'8"	12'9"	13'10"	14'10"
35 psf	L/240	12	15'0"	16'5"	17'9"	19'0"	19'1"	20'9"	22'3"	20'9"	22'6"	24'1"
		16	13'7"	14'11"	16'2"	17'3"	17'4"	18'10"	20'2"	18'10"	20'5"	21'11"
		24	11'10"	13'0"	14'1"	15'1"	15'2"	16'5"	17'8"	16'5"	17'10"	19'2"
	L/360	12	13'1"	14'4"	15'6"	16'7"	16'8"	18'1"	19'5"	18'1"	19'8"	21'1"
		16	11'10"	13'0"	14'1"	15'1"	15'2"	16'5"	17'8"	16'5"	17'10"	19'2"
		24	10'4"	11'4"	12'4"	13'2"	13'3"	14'4"	15'4"	14'4"	15'7"	16'9"
	L/600	12	11'0"	12'1"	13'1"	14'0"	14'1"	15'3"	16'4"	15'3"	16'7"	17'9"
		16	10'0"	11'0"	11'11"	12'9"	12'10"	13'10"	14'11"	13'11"	15'1"	16'2"
		24	8'9"	9'7"	10'5"	11'2"	11'2"	12'1"	13'0"	12'1"	13'2"	14'1"
40 psf	L/240	12	14'4"	15'8"	17'0"	18'2"	18'3"	19'10"	21'3"	19'10"	21'6"	23'1"
		16	13'0"	14'3"	15'5"	16'6"	16'7"	18'0"	19'4"	18'0"	19'6"	20'11"
		24	11'4"	12'5"	13'6"	14'5"	14'6"	15'9"	16'10"	15'9"	17'1"	18'4"
	L/360	12	12'6"	13'8"	14'10"	15'11"	16'0"	17'4"	18'7"	17'4"	18'9"	20'2"
		16	11'4"	12'5"	13'6"	14'5"	14'6"	15'9"	16'10"	15'9"	17'1"	18'4"
		24	9'11"	10'10"	11'9"	12'7"	12'8"	13'9"	14'9"	13'9"	14'11"	16'0"
	L/600	12	10'7"	11'7"	12'6"	13'5"	13'6"	14'7"	15'8"	14'7"	15'10"	17'0"
		16	9'7"	10'6"	11'4"	12'2"	12'3"	13'3"	14'2"	13'3"	14'5"	15'5"
		24	8'4"	9'2"	9'11"	10'8"	10'8"	11'7"	12'5"	11'7"	12'7"	13'6"

Table 33

SJ Studs: Curtain Wall Limiting Heights

Sheathing Both Sides

Wind load	Deflection limitation	Stud spacing (in o.c.)	362 SJ (3½")				40 SJ (4")					
			20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge		
15 psf	L/240	12	14'2"	15'3"	16'4"	17'5"	15'2"	16'5"	17'7"	18'8"		
		16	13'1"	14'1"	15'0"	15'11"	14'0"	15'1"	16'2"	17'2"		
		24	11'5"	12'4"	13'2"	13'11"	12'3"	13'2"	14'1"	15'0"		
	L/360	12	12'4"	13'4"	14'3"	15'2"	13'3"	14'4"	15'4"	16'4"		
		16	11'5"	12'4"	13'2"	13'11"	12'3"	13'2"	14'1"	15'0"		
		24	10'0"	10'9"	11'6"	12'2"	10'9"	11'6"	12'4"	13'1"		
20 psf	L/240	12	12'10"	13'11"	14'10"	15'10"	13'9"	14'11"	16'0"	17'0"		
		16	11'11"	12'10"	13'8"	14'6"	12'9"	13'9"	14'8"	15'7"		
		24	10'5"	11'2"	11'11"	12'8"	11'2"	12'0"	12'10"	13'7"		
	L/360	12	11'3"	12'2"	13'0"	13'10"	12'1"	13'0"	13'11"	14'10"		
		16	10'5"	11'2"	11'11"	12'8"	11'2"	12'0"	12'10"	13'7"		
		24	9'1"	9'9"	10'5"	11'1"	9'9"	10'6"	11'2"	11'11"		
25 psf	L/240	12	11'11"	12'11"	13'10"	14'8"	12'10"	13'10"	14'10"	15'9"		
		16	11'1"	11'11"	12'8"	13'5"	11'10"	12'9"	13'7"	14'5"		
		24	9'8"	10'5"	11'1"	11'9"	10'4"	11'2"	11'11"	12'8"		
	L/360	12	10'5"	11'3"	12'1"	12'10"	11'2"	12'1"	12'11"	13'9"		
		16	9'8"	10'5"	11'1"	11'9"	10'4"	11'2"	11'11"	12'8"		
		24	8'5"	9'1"	9'8"	10'3"	9'0"	9'9"	10'5"	11'0"		
30 psf	L/240	12	11'3"	12'2"	13'0"	13'10"	12'1"	13'0"	13'11"	14'10"		
		16	10'5"	11'2"	11'11"	12'8"	11'2"	12'0"	12'10"	13'7"		
		24	9'1"	9'9"	10'5"	11'1"	9'9"	10'6"	11'2"	11'11"		
	L/360	12	9'10"	10'7"	11'4"	12'1"	10'6"	11'4"	12'2"	13'0"		
		16	9'1"	9'9"	10'5"	11'1"	9'9"	10'6"	11'2"	11'11"		
		24	7'11"	8'6"	9'1"	9'8"	8'6"	9'2"	9'9"	10'5"		
35 psf	L/240	12	10'8"	11'6"	12'4"	13'1"	11'5"	12'4"	13'3"	14'1"		
		16	9'10"	10'7"	11'4"	12'0"	10'7"	11'5"	12'2"	12'11"		
		24	8'7"	9'3"	9'11"	10'6"	9'3"	9'11"	10'8"	11'3"		
	L/360	12	9'4"	10'1"	10'9"	11'5"	10'0"	10'10"	11'7"	12'4"		
		16	8'7"	9'3"	9'11"	10'6"	9'3"	9'11"	10'8"	11'3"		
		24	7'6"	8'1"	8'8"	9'2"	8'1"	8'8"	9'4"	9'10"		
40 psf	L/240	12	10'2"	11'0"	11'10"	12'6"	10'11"	11'10"	12'8"	13'6"		
		16	9'5"	10'2"	10'10"	11'6"	10'1"	10'11"	11'8"	12'4"		
		24	8'3"	8'10"	9'6"	10'1"	8'10"	9'6"	10'2"	10'10"		
	L/360	12	8'11"	9'8"	10'4"	10'11"	9'7"	10'4"	11'1"	11'9"		
		16	8'3"	8'10"	9'6"	10'1"	8'10"	9'6"	10'2"	10'10"		
		24	7'2"	7'9"	8'3"	8'9"	7'9"	8'4"	8'11"	9'5"		
Wind load	Deflection limitation	Stud spacing (in o.c.)	60 SJ (6")				725 SJ (7¼")			80 SJ (8")		
			20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
15 psf	L/240	12	20'9"	22'6"	24'3"	25'10"	26'2"	28'2"	30'1"	28'4"	30'7"	32'7"
		16	19'2"	20'9"	22'3"	23'8"	24'1"	25'10"	27'6"	26'0"	28'0"	29'10"
		24	16'9"	18'1"	19'5"	20'8"	21'0"	22'7"	24'0"	22'9"	24'5"	26'1"
	L/360	12	18'2"	19'8"	21'2"	22'7"	22'11"	24'8"	26'3"	24'9"	26'8"	28'6"
		16	16'9"	18'1"	19'5"	20'8"	21'0"	22'7"	24'0"	22'9"	24'5"	26'1"
		24	14'7"	15'10"	17'0"	18'1"	18'4"	19'9"	21'0"	19'10"	21'4"	22'9"
20 psf	L/240	12	18'11"	20'6"	22'0"	23'6"	23'10"	25'8"	27'4"	25'9"	27'9"	29'7"
		16	17'5"	18'10"	20'2"	21'6"	21'10"	23'6"	25'0"	23'8"	25'5"	27'1"
		24	15'3"	16'5"	17'8"	18'9"	19'1"	20'6"	21'10"	20'8"	22'2"	23'8"
	L/360	12	16'6"	17'11"	19'3"	20'6"	20'10"	22'5"	23'10"	22'6"	24'3"	25'11"
		16	15'3"	16'5"	17'8"	18'9"	19'1"	20'6"	21'10"	20'8"	22'2"	23'8"
		24	13'3"	14'4"	15'5"	16'5"	16'8"	17'11"	19'1"	18'1"	19'5"	20'8"
25 psf	L/240	12	17'6"	19'0"	20'5"	21'9"	22'1"	23'9"	25'4"	23'11"	25'9"	27'6"
		16	16'2"	17'6"	18'9"	19'11"	20'3"	21'10"	23'2"	21'11"	23'7"	25'2"
		24	12'10"	15'3"	16'5"	17'5"	17'9"	19'0"	20'3"	19'2"	20'7"	22'0"
	L/360	12	15'4"	16'7"	17'10"	19'0"	19'4"	20'9"	22'2"	20'11"	22'6"	24'0"
		16	14'1"	15'3"	16'5"	17'5"	17'9"	19'0"	20'3"	19'2"	20'7"	22'0"
		24	12'4"	13'4"	14'4"	15'3"	15'6"	16'8"	17'8"	16'9"	18'0"	19'2"
30 psf	L/240	12	16'6"	17'11"	19'3"	20'6"	20'10"	22'5"	23'10"	22'6"	24'3"	25'11"
		16	15'3"	16'5"	17'8"	18'9"	19'1"	20'6"	21'10"	20'8"	22'2"	23'8"
		24	10'8"	14'4"	15'5"	16'5"	16'8"	17'11"	19'1"	16'9"	19'5"	20'8"
	L/360	12	14'5"	15'8"	16'10"	17'11"	18'2"	19'7"	20'10"	19'8"	21'2"	22'7"
		16	13'3"	14'4"	15'5"	16'5"	16'8"	17'11"	19'1"	18'1"	19'5"	20'8"
		24	10'8"	12'7"	13'6"	14'4"	14'7"	15'8"	16'8"	15'9"	16'11"	18'1"
35 psf	L/240	12	15'8"	17'0"	18'3"	19'6"	19'9"	21'3"	22'8"	21'5"	23'0"	24'7"
		16	13'9"	15'7"	16'9"	17'10"	18'2"	19'6"	20'9"	19'7"	21'1"	22'6"
		24	9'2"	13'8"	14'8"	15'7"	15'10"	17'0"	18'1"	14'4"	18'5"	19'8"
	L/360	12	13'8"	14'10"	16'0"	17'0"	17'3"	18'7"	19'10"	18'8"	20'1"	21'6"
		16	12'7"	13'8"	14'8"	15'7"	15'10"	17'0"	18'1"	17'2"	18'5"	19'8"
		24	9'2"	11'11"	12'9"	13'7"	13'10"	14'10"	15'10"	14'4"	16'1"	17'2"
40 psf	L/240	12	15'0"	16'3"	17'6"	18'8"	18'11"	20'4"	21'8"	20'5"	22'0"	23'6"
		16	12'0"	14'11"	16'0"	17'1"	17'4"	18'8"	19'10"	18'9"	20'2"	21'6"
		24	8'0"	12'10"	14'0"	14'11"	14'3"	16'3"	17'4"	12'7"	17'7"	18'9"
	L/360	12	13'1"	14'2"	15'3"	16'3"	16'6"	17'9"	18'11"	17'0"	19'3"	20'6"
		16	12'0"	13'1"	14'0"	14'11"	15'2"	16'3"	17'4"	16'5"	17'7"	18'9"
		24	8'0"	11'5"	12'3"	13'0"	13'3"	14'3"	15'2"	12'7"	15'5"	16'5"

Limiting heights are for SJ members with 40 ksi yield strength (Fy) and based on lateral bracing provided by mechanically fastened gypsum board or sheathing each side. Contact Unimast Technical Department for information on 33 ksi and 50 ksi members. Stress based on the properties of the studs alone with a 33% increase for wind loading. Deflection based on composite wall assembly (gypsum sheathing and dry exterior finish and drywall or plaster interior) without addition of the exterior finish stiffness. See Design Considerations, page 39.

Table 34

SN Studs: Curtain Wall Limiting Heights

Stud Properties Only

Wind load	Deflection limitation	Stud spacing (in o.c.)	358 SN (3½")				600 SN (6")				800 SN (8")		
			20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
15 psf	L/240	12	12'6"	13'8"	14'7"	15'8"	18'7"	20'5"	21'10"	23'5"	25'11"	27'7"	29'10"
		16	11'5"	12'5"	13'2"	14'2"	16'11"	18'6"	19'10"	21'4"	23'6"	25'1"	27'1"
		24	9'11"	10'11"	11'7"	12'5"	14'10"	16'2"	17'4"	18'7"	20'6"	21'11"	23'7"
	L/360	12	10'11"	11'11"	12'8"	13'8"	16'4"	17'9"	19'0"	20'6"	22'7"	24'1"	26'0"
		16	9'11"	10'11"	11'7"	12'5"	14'10"	16'2"	17'4"	18'7"	20'6"	21'11"	23'7"
		24	8'9"	9'6"	10'1"	10'11"	12'11"	14'1"	15'1"	16'4"	17'11"	19'2"	20'7"
20 psf	L/240	12	11'5"	12'5"	13'2"	14'2"	16'11"	18'6"	19'10"	21'4"	23'6"	25'1"	27'1"
		16	10'4"	11'4"	12'0"	12'11"	15'5"	16'9"	18'0"	19'5"	21'5"	22'10"	24'7"
		24	9'0"	9'11"	10'6"	11'4"	13'5"	14'8"	15'8"	16'11"	18'8"	19'11"	21'6"
	L/360	12	9'11"	10'11"	11'7"	12'5"	14'10"	16'2"	17'4"	18'7"	20'6"	21'11"	23'7"
		16	9'0"	9'11"	10'6"	11'4"	13'5"	14'8"	15'8"	16'11"	18'8"	19'11"	21'6"
		24	7'11"	8'7"	9'2"	9'11"	11'8"	12'11"	13'8"	14'10"	16'4"	17'5"	18'10"
25 psf	L/240	12	10'6"	11'6"	12'4"	13'2"	15'8"	17'2"	18'5"	19'10"	21'10"	23'4"	25'1"
		16	9'7"	10'6"	11'2"	12'0"	14'4"	15'7"	16'8"	18'0"	17'4"	21'2"	23'10"
		24	8'5"	9'2"	9'8"	10'6"	12'6"	13'8"	14'7"	15'8"	20'6"	18'6"	19'11"
	L/360	12	9'2"	10'1"	10'8"	11'6"	13'8"	15'0"	16'0"	17'4"	19'1"	20'5"	21'11"
		16	8'5"	9'2"	9'8"	10'6"	12'6"	13'8"	14'7"	15'8"	17'4"	18'6"	19'11"
		24	7'4"	8'0"	8'6"	9'2"	10'11"	11'11"	12'8"	13'8"	15'1"	16'2"	17'5"
30 psf	L/240	12	9'11"	10'11"	11'7"	12'5"	14'10"	16'2"	17'4"	18'7"	20'6"	21'11"	23'7"
		16	9'0"	9'11"	10'6"	11'4"	13'5"	14'8"	15'8"	16'11"	18'8"	19'11"	21'6"
		24	7'11"	8'7"	9'2"	9'11"	11'8"	12'11"	13'8"	14'10"	16'4"	17'5"	18'10"
	L/360	12	8'8"	9'6"	10'1"	10'11"	12'11"	14'1"	15'1"	16'4"	17'11"	19'2"	20'7"
		16	7'11"	8'7"	9'2"	9'11"	11'8"	12'11"	13'8"	14'10"	16'4"	17'5"	18'10"
		24	6'11"	7'6"	8'0"	8'7"	10'2"	11'2"	12'0"	12'11"	14'2"	15'2"	16'5"

Table 35

ST20 Studs: Curtain Wall Limiting Heights

Stud Properties Only

Wind load	Stud spacing (in o.c.)	L/240				L/360				L/600			
		212ST20	358ST20	400ST20	600ST20	212ST20	358ST20	400ST20	600ST20	212ST20	358ST20	400ST20	600ST20
15 psf	12	9'1"	12'2"	13'2"	18'2"	8'0"	10'7"	11'6"	15'10"	6'8"	9'0"	9'8"	13'4"
	16	8'3"	11'1"	12'0"	16'7"	7'3"	9'8"	10'6"	14'6"	6'1"	8'2"	8'9"	12'2"
	24	7'3"	9'8"	10'6"	14'6"	6'3"	8'6"	9'1"	12'7"	5'3"	7'1"	7'8"	10'8"
20 psf	12	8'3"	11'1"	12'0"	16'7"	7'3"	9'8"	10'6"	14'6"	6'1"	8'2"	8'9"	12'2"
	16	7'6"	10'1"	10'10"	15'0"	6'7"	8'9"	9'6"	13'1"	5'7"	7'4"	8'0"	11'1"
	24	6'7"	8'9"	9'6"	13'1"	5'9"	7'8"	8'3"	11'6"	4'10"	6'6"	7'0"	9'8"
25 psf	12	7'8"	10'3"	11'1"	15'4"	6'8"	9'0"	9'8"	13'4"	5'8"	7'7"	8'2"	11'3"
	16	7'0"	9'3"	10'1"	14'0"	6'1"	8'2"	8'9"	12'2"	5'2"	6'10"	7'4"	10'3"
	24	6'1"	8'2"	8'9"	12'2"	5'3"	7'1"	7'8"	10'8"	4'6"	6'0"	6'6"	9'0"
30 psf	12	7'3"	9'8"	10'6"	14'6"	6'3"	8'6"	9'1"	12'7"	5'3"	7'2"	7'8"	10'8"
	16	6'7"	8'9"	9'6"	13'1"	5'9"	7'8"	8'3"	11'6"	4'10"	6'6"	7'0"	9'8"
	24	5'9"	7'8"	8'3"	11'6"	5'0"	6'8"	7'2"	10'0"	4'2"	5'8"	6'1"	8'6"
35 psf	12	6'10"	9'2"	9'10"	13'8"	6'0"	8'0"	8'8"	12'0"	5'1"	6'9"	7'3"	10'1"
	16	6'3"	8'3"	9'0"	12'6"	5'6"	7'3"	7'10"	10'10"	4'7"	6'2"	6'7"	9'2"
	24	5'6"	7'3"	7'10"	10'10"	4'9"	6'4"	6'10"	9'6"	4'0"	5'4"	5'9"	8'0"
40 psf	12	6'7"	8'9"	9'6"	13'1"	5'9"	7'8"	8'3"	11'6"	4'10"	6'6"	7'0"	9'8"
	16	6'0"	8'0"	8'7"	11'10"	5'2"	7'0"	7'6"	10'4"	4'4"	5'10"	6'4"	8'9"
	24	5'2"	7'0"	7'6"	10'4"	4'7"	6'1"	6'7"	9'1"	3'10"	5'1"	6'7"	7'8"

Table 36

ST20 Studs: Curtain Wall Limiting Heights

Sheathing Both Sides

Wind load	Stud spacing (in o.c.)	Deflection criteria											
		L/240				L/360				L/600			
		212ST20	358ST20	400ST20	600ST20	212ST20	358ST20	400ST20	600ST20	212ST20	358ST20	400ST20	600ST20
15 psf	12	12'2"	16'1"	17'4"	23'9"	9'8"	12'9"	13'9"	18'10"	8'6"	11'2"	12'0"	16'6"
	16	11'0"	14'6"	15'6"	20'8"	9'0"	11'9"	12'8"	17'4"	7'9"	10'3"	11'1"	15'2"
	24	9'0"	11'9"	12'8"	16'10"	8'1"	10'7"	11'4"	15'6"	7'1"	9'2"	9'10"	13'6"
20 psf	12	11'0"	14'6"	15'6"	20'8"	8'9"	11'7"	12'6"	17'2"	7'8"	10'1"	10'10"	15'0"
	16	9'6"	12'6"	13'4"	17'10"	8'1"	10'8"	11'6"	15'9"	7'1"	9'4"	10'1"	13'9"
	24	7'9"	10'2"	11'0"	14'7"	7'4"	9'7"	10'3"	14'1"	6'4"	8'4"	9'0"	12'3"
25 psf	12	9'9"	12'10"	13'10"	18'6"	8'2"	10'9"	11'7"	15'10"	7'1"	9'4"	10'2"	13'10"
	16	8'6"	11'2"	12'0"	16'0"	7'7"	9'10"	10'8"	14'7"	6'7"	8'8"	9'4"	12'9"
	24	6'10"	9'1"	9'9"	13'1"	6'9"	8'10"	9'7"	13'1"	6'0"	7'9"	8'4"	11'4"
30 psf	12	9'0"	11'9"	12'8"	16'10"	7'8"	10'1"	10'10"	15'0"	6'8"	8'10"	9'7"	13'1"
	16	7'9"	10'2"	11'0"	14'7"	7'1"	9'4"	10'1"	13'9"	6'2"	8'2"	8'9"	12'0"
	24	6'3"	8'3"	9'0"	12'0"	6'3"	8'3"	9'0"	12'0"	5'7"	7'3"	7'10"	10'8"
35 psf	12	8'3"	10'10"	11'8"	15'7"	7'3"	9'7"	10'4"	14'2"	6'4"	8'4"	9'1"	12'4"
	16	7'2"	9'6"	10'2"	13'7"	6'4"	8'10"	9'7"	13'1"	5'10"	7'9"	8'4"	11'4"
	24	5'10"	7'8"	8'3"	11'1"	5'10"	7'8"	8'3"	11'1"	5'3"	7'0"	7'6"	10'2"
40 psf	12	7'9"	10'2"	11'0"	14'7"	7'0"	9'2"	9'10"	13'7"	6'1"	8'1"	8'8"	11'10"
	16	6'8"	8'9"	9'6"	12'8"	6'6"	8'6"	9'2"	12'6"	5'8"	7'4"	8'0"	10'10"
	24	5'6"	7'2"	7'9"	10'4"	5'6"	7'2"	7'9"	10'4"	5'1"	6'8"	7'2"	9'9"

Limiting heights are for ST20 members with 33 ksi yield strength (Fy) and based on lateral bracing provided by mechanically fastened gypsum board or sheathing each side. Stress based on the properties of studs alone increased 33% for wind loading. Deflection based on composite wall assembly (gypsum sheathing and any dry exterior finish and drywall or plaster interior) without addition of the exterior finish stiffness. See Design Considerations, page 39.

Table 37

CW Studs: Curtain Wall Limiting Heights

Stud Properties Only

Wind Load	Deflection limitation	Stud Spacing (in. o.c.)	358 CW (3 ⁵ / ₈ ")				600 CW (6")				800 CW (8")		
			20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
15 psf	L/240	12	11.85	13.29	14.28	15.44	17.60	19.86	21.36	23.12	25.15	27.15	29.40
		16	10.77	12.08	12.98	14.03	15.99	18.04	19.41	21.01	22.85	24.67	26.71
		24	9.41	10.55	11.34	12.25	13.97	15.76	16.95	18.35	19.96	21.55	23.34
	L/360	12	10.35	11.61	12.48	13.49	15.38	17.35	18.66	20.20	21.97	23.72	25.69
		16	9.41	10.55	11.34	12.25	13.97	15.76	16.95	18.35	19.96	21.55	23.34
		24	8.22	9.22	9.90	10.70	12.21	13.77	14.81	16.03	17.44	18.83	20.39
	L/600	12	8.73	9.79	10.52	11.37	12.97	14.63	15.74	17.04	18.53	20.01	21.66
		16	7.93	8.90	9.56	10.33	11.78	13.29	14.30	15.48	16.84	18.18	19.68
		24	6.93	7.77	8.35	9.03	10.29	11.61	12.49	13.52	14.71	15.88	17.19
20 psf	L/240	12	10.77	12.08	12.98	14.03	15.99	18.04	19.41	21.01	22.85	24.67	26.71
		16	9.78	10.97	11.79	12.74	14.53	16.39	17.63	19.09	20.76	22.41	24.27
		24	8.55	9.59	10.30	11.13	12.69	14.32	15.40	16.67	18.14	19.58	21.20
	L/360	12	9.41	10.55	11.34	12.25	13.97	15.76	16.95	18.35	19.96	21.55	23.34
		16	8.55	9.59	10.30	11.13	12.69	14.32	15.40	16.67	18.14	19.58	21.20
		24	7.47	8.37	9.00	9.73	11.09	12.51	13.46	14.56	15.84	17.11	18.52
	L/600	12	7.93	8.90	9.56	10.33	11.78	13.29	14.30	15.48	16.84	18.18	19.68
		16	7.21	8.08	8.69	9.39	10.71	12.08	12.99	14.06	15.30	16.52	17.88
		24	6.30	7.06	7.59	8.20	9.35	10.55	11.35	12.28	13.36	14.43	15.62
25 psf	L/240	12	10.00	11.21	12.05	13.02	14.85	16.75	18.02	19.50	21.21	22.90	24.80
		16	9.08	10.19	10.95	11.83	13.49	15.22	16.37	17.72	19.27	20.81	22.53
		24	7.93	8.90	9.56	10.33	11.78	13.29	14.30	15.48	16.84	18.18	19.68
	L/360	12	8.73	9.79	10.52	11.37	12.97	14.63	15.74	17.04	18.53	20.01	21.66
		16	7.93	8.90	9.56	10.33	11.78	13.29	14.30	15.48	16.84	18.18	19.68
		24	6.93	7.77	8.35	9.03	10.29	11.61	12.49	13.52	14.71	15.88	17.19
	L/600	12	7.37	8.26	8.88	9.59	10.94	12.34	13.28	14.37	15.63	16.87	18.27
		16	6.69	7.51	8.06	8.72	9.94	11.21	12.06	13.05	14.20	15.33	16.60
		24	5.85	6.56	7.05	7.61	8.68	9.79	10.54	11.40	12.41	13.39	14.50
30 psf	L/240	12	9.41	10.55	11.34	12.25	13.97	15.76	16.95	18.35	19.96	21.55	23.34
		16	8.55	9.59	10.30	11.13	12.69	14.32	15.40	16.67	18.14	19.58	21.20
		24	7.47	8.37	9.00	9.73	11.09	12.51	13.46	14.56	15.84	17.11	18.52
	L/360	12	8.22	9.22	9.90	10.70	12.21	13.77	14.81	16.03	17.44	18.83	20.39
		16	7.47	8.37	9.00	9.73	11.09	12.51	13.46	14.56	15.84	17.11	18.52
		24	6.52	7.31	7.86	8.50	9.69	10.93	11.76	12.72	13.84	14.94	16.18
	L/600	12	6.93	7.77	8.35	9.03	10.29	11.61	12.49	13.52	14.71	15.88	17.19
		16	6.30	7.06	7.59	8.20	9.35	10.55	11.35	12.28	13.36	14.43	15.62
		24	5.50	6.17	6.63	7.17	8.17	9.22	9.92	10.73	11.67	12.60	13.65
35psf	L/240	12	8.94	10.02	10.77	11.64	13.27	14.97	16.11	17.43	18.96	20.47	22.17
		16	8.12	9.11	9.78	10.57	12.06	13.60	14.83	15.84	17.23	18.60	20.14
		24	7.09	7.95	8.55	9.24	10.53	11.88	12.78	13.84	15.05	16.25	17.59
	L/360	12	7.81	8.75	9.41	10.17	11.59	13.08	14.07	15.23	16.56	17.88	19.37
		16	7.09	7.95	8.55	9.24	10.83	11.88	12.78	13.84	15.05	16.25	17.59
		24	6.20	6.95	7.47	8.07	9.20	10.38	11.17	12.09	13.15	14.19	15.37
	L/600	12	6.58	7.38	7.93	8.58	9.78	11.03	11.87	12.84	13.97	15.08	16.33
		16	5.98	6.71	7.21	7.79	8.89	10.02	10.78	11.67	12.69	13.70	14.84
		24	5.23	5.86	6.30	6.81	7.76	8.75	9.42	10.19	11.09	11.97	12.96
40 psf	L/240	12	8.55	9.59	10.30	11.13	12.69	14.32	15.40	16.67	18.14	19.58	21.20
		16	7.77	8.71	9.36	10.11	11.53	13.01	14.00	15.15	16.48	17.79	19.26
		24	6.78	7.61	8.18	8.84	10.08	11.36	12.23	13.23	14.39	15.54	16.83
	L/360	12	7.47	8.37	9.00	9.73	11.09	12.51	13.46	14.56	15.84	17.11	18.52
		16	6.78	7.61	8.18	8.84	10.08	11.36	12.23	13.23	14.39	15.54	16.83
		24	5.93	6.65	7.14	7.72	8.80	9.93	10.68	11.56	12.58	13.58	14.70
	L/600	12	6.30	7.06	7.59	8.20	9.35	10.55	11.35	12.28	13.36	14.43	15.62
		16	5.72	6.42	6.90	7.45	8.50	9.59	10.31	11.16	12.14	13.11	14.19
		24	5.00	5.61	6.02	6.51	7.42	8.37	9.01	9.75	10.61	11.45	12.40

(1) Yield strength (Fy) is 33 ksi. (2) Limiting heights are based on lateral bracing provided by mechanically fastened gypsum board or sheathing each side. (3) Stress and deflection are based on the properties of stud alone. (4) Allowable stress for wind loads has been increased by 33% in accordance with A.I.S.I. specification. (5) All studs must be checked for web crippling.

NEW FROM UNIMAST!

CW Studs provide excellent performance economically. Consult your Unimast Sales Office for detailed cost information.

Drywall partitions are designed to withstand a 5 psf lateral load but are not designed to carry axial loads. ST studs are typically used for interior nonload-bearing partitions but SN and SJ members may be used when the heights exceed those allowed with ST drywall studs.

Table 38

Interior Framing: Limiting Heights

Member	Stud spacing	Allow. defl.	Partition, one layer	Partition, two layers	Furred wall, one layer
25 gauge (.0179" min.)					
158ST25	16"	L/120	10'9"f	10'9'd	10'3"d
		L/240	9'6"d	10'6'd	8'3"d
		L/360	8'3"d	9'0'd	7'3"d
	24"	L/120	8'9"f	8'3"	3'f
		L/240	8'3"d	8'3"	1'3"d
		L/360	7'3"d	8'0'd	6'3"d
212ST25	16"	L/120	13'9"f	13'9'f	13'9'd*
		L/240	12'6'd	13'6'd	11'0'd
		L/360	10'9'd	11'9'd	9'9'd
	24"	L/120	11'3'f	11'3'f	11'3'f
		L/240	10'9'd	11'3'f	9'9'd
		L/360	9'6'd	10'3'd	8'6'd
358ST25	16"	L/120	16'9'f	16'9'f	16'9'f*
		L/240	16'0'd	16'9'f	14'6'd*
		L/360	14'0'd	14'9'f	12'9'd*
	24"	L/120	13'6'f	13'6'f	13'6'f*
		L/240	13'6'f	13'6'f	12'9'd*
		L/360	12'3'd	13'0'd	11'0'd
400ST25	16"	L/120	17'3'f	17'3'f	17'3'f*
		L/240	17'3'd	17'3'f	15'9'd*
		L/360	15'0'd	15'9'd*	13'9'd*
	24"	L/120	14'3'f	14'3'f	14'3'f*
		L/240	14'3'f	14'3'f	13'9'd*
		L/360	13'0'd	13'9'd	12'0'd
600ST25	16"	L/120	20'0'f	20'0'f	20'0'f*
		L/240	20'0'f	20'0'f	20'0'f*
		L/360	20'0'f	20'0'f	18'9'f*
	24"	L/120	15'0'v	15'0'v	15'0'v*
		L/240	15'0'v	15'0'v	15'0'v*
		L/360	15'0'v	15'0'v	15'0'v*
22 gauge (.0270" min.)					
212ST22	16"	L/120	16'6'd	17'0'f	15'3'd*
		L/240	13'0'd	14'0'd	12'0'd
		L/360	11'6'd	12'3'd	10'6'd
	24"	L/120	14'0'f	14'0'f	13'3'd*
		L/240	11'6'd	12'3'd	10'6'd
		L/360	10'0'd	10'6'd	9'3'd
358ST22	16"	L/120	21'9'd	22'0'f	20'3'd*
		L/240	17'3'd	18'0'd	16'0'd*
		L/360	15'0'd	15'9'd	14'0'd*
	24"	L/120	18'0'f	18'0'f	17'9'd*
		L/240	15'0'd	15'9'd	14'0'd*
		L/360	13'0'd	13'9'd	12'3'd
400ST22	16"	L/120	23'3'f	23'3'f	21'9'd*
		L/240	18'6'd	19'3'd	17'3'd*
		L/360	16'3'd	16'9'd	15'0'd*
	24"	L/120	19'0'f	19'0'f	19'0'f*
		L/240	16'3'd	16'9'd	15'0'd*
		L/360	14'0'd	14'9'd	13'3'd*
600ST22	16"	L/120	29'0'f	29'0'f	29'0'f*
		L/240	25'3'd	26'0'd	23'9'd*
		L/360	22'0'd	22'9'd	20'9'd*
	24"	L/120	23'6'f	23'6'f	23'6'f*
		L/240	22'0'd	22'9'd	20'9'd*
		L/360	19'3'd	19'9'd	18'3'd*

Limiting heights for 1/2" or 5/8" thick gypsum panels and 5 psf uniform load perpendicular to partition or furring. Use one-layer heights for unbalanced assemblies; use two-layer heights for multi-layer assemblies. For furring, stud attached to top and bottom runners and free-standing up to 12 ft. heights. *Studs exceeding 12 ft. height require mid-height anchor to exterior wall. Assemblies without face panels and chase wall partitions require vertical cross braces 4 ft. o.c. maximum. Limiting criteria: d - deflection, f - bending stress, v - end reaction shear. Consult local code authority for limiting criteria.

The following tables contain limiting heights for ST studs in interior partitions and chase walls. Limiting heights for 362SJ20 and 40SJ20 are also shown. Limiting heights for other SJ members and for tall walls are available from the Unimast Technical Department nearest you.




Member	Stud spacing	Allow. defl.	Partition, one layer	Partition, two layers	Furred wall, one layer
20 gauge (.0312" min.)					
					
212ST20	16"	L/120	17'4"d	17'11"f	16'6"d
		L/240	13'10"d	16'1"d	13'0"d
		L/360	12'0"d	14'0"d	11'6"d
	24"	L/120	14'7"f	14'7"f	14'6"d*
		L/240	12'0"d	13'5"f	11'6"d
		L/360	10'6"d	12'4"d	10'0"d
358ST20	16"	L/120	22'7"d	23'8"f	21'9"d*
		L/240	17'11"d	20'2"d	17'3"d*
		L/360	15'7"d	17'8"d	15'0"d*
	24"	L/120	19'4"f	19'4"f	19'0"d*
		L/240	15'7"d	17'8"d	15'0"d*
		L/360	13'8"d	15'6"d	13'3"d*
400ST20	16"	L/120	24'3"d	25'6"f	23'6"d*
		L/240	19'2"d	21'7"d	18'9"d*
		L/360	16'10"d	18'11"d	16'3"d*
	24"	L/120	20'9"f	20'9"f	20'6"d*
		L/240	16'10"d	18'11"d	16'3"d*
		L/360	14'8"d	16'6"d	14'3"d*
600ST20	16"	L/120	32'11"d	33'11"f	32'3"d*
		L/240	26'1"d	28'6"d	25'6"d*
		L/360	22'10"d	24'11"d	23'3"d*
	24"	L/120	25'3"f	25'3"f	28'0"d*
		L/240	22'10"d	24'11"d	22'3"d*
		L/360	19'11"d	21'10"d	19'6"d*
SJ style (.0341" min.)					
362SJ20	16"	L/120	24'0"d	25'0"d	23'0"d*
		L/240	19'0"d	19'9"d	18'3"d*
		L/360	16'9"d	17'3"d	16'0"d*
	24"	L/120	21'0"d	21'9"d	20'3"d*
		L/240	16'9"d	17'3"d	16'0"d*
		L/360	14'6"d	15'0"d	14'0"d*
40SJ20	16"	L/120	25'9"d	26'9"d	24'9"d*
		L/240	20'6"d	21'3"d	19'9"d*
		L/360	18'0"d	18'6"d	17'3"d*
	24"	L/120	22'6"d	23'3"d	21'6"d*
		L/240	18'0"d	18'6"d	17'3"d*
		L/360	15'9"d	16'3"d	15'0"d*

Table 39

Chase Wall: Limiting Heights

Member	Stud spacing	Allow. defl.	Partition, one layer	Partition, two layers
158ST25	16"	L/120	15'3"f	15'3"f
		L/240	13'3"d	14'6"d
		L/360	11'6"d	12'9"d
	24"	L/120	12'6"f	12'6"f
		L/240	11'6"d	12'6"f
		L/360	10'0"d	11'0"d
212ST25	16"	L/120	19'6"f	19'6"f
		L/240	17'6"d	19'0"d
		L/360	15'6"d	16'6"d
	24"	L/120	16'0"f	16'0"f
		L/240	15'6"d	16'0"f
		L/360	13'6"d	14'6"d
358ST25	16"	L/120	23'6"f	23'6"f
		L/240	22'9"d	23'6"f
		L/360	19'9"d	21'3"d
	24"	L/120	19'3"f	19'3"f
		L/240	19'3"f	19'3"f
		L/360	17'3"d	18'6"d

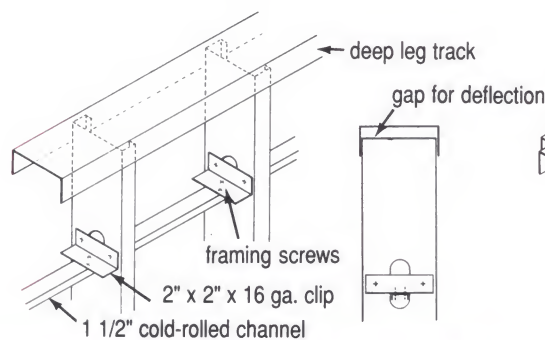
Curtain wall slip tracks may be required to accommodate the deflection of floor beams or floor decks above curtain wall or interior partitions. Slip tracks cannot be used in axial load bearing stud conditions or above continuous window spandrels.

Details for a single slip track and a double slip track, using custom deep leg tracks, are shown below. The single track detail requires 1 1/2" cold-rolled channel and 2" x 2" x 16-gauge clips installed

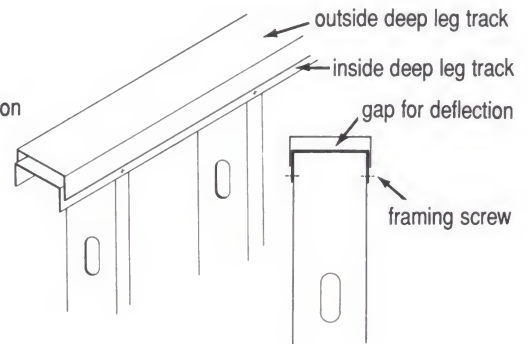
continuously through the uppermost punchouts to align the studs vertically within the plane of the wall.

Slip track details must be designed for the specific conditions of a building to accommodate the required deflection and the end reactions of the studs. The deep leg tracks are not standard and the gauge, width and leg length must be specified for each particular application. All detailing and connections should be specified by a qualified engineer or architect.

Single slip track



Double slip track



CURTAIN WALL SLIDE CLIP

Curtain wall slide clips attach Unimast SJ, SN or ST studs used in curtain wall applications to horizontal supports, while allowing vertical movement of the structure without transferring compressive loads to the studs.

The curtain wall slide clip resists tension loads caused by *negative* wind pressure (suction) on exterior curtain walls. Based on the gauge of stud being used, the safe design loads (lbs.) for the

slide clip are given in the table below. The safe design load is the maximum tension load of the stud/clip combination.

In addition to checking the tension created by negative wind pressure, web crippling of studs with respect to the bearing width must be checked for positive wind pressures. For continuous span conditions, the combined bending and web crippling at interior supports must be checked per AISI Sections C3.4 and C3.5.

Table 33

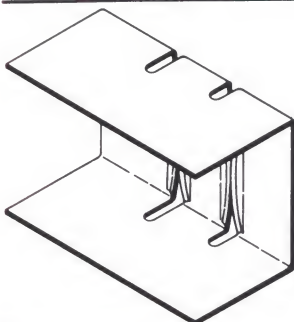
Curtain Wall Slide Clip:
Allowable Design Loads

Stud Style	Stud Gauge/ thickness	Safe Design Load (lbs)
*ST	20 (.0329")	364
*SN	20 (.0329")	364
SN	18 (.0438")	388
SN	16 (.0548")	486
SN	14 (.0697")	618
**SJ	20 (.0359")	482
SJ	18 (.0478")	514
SJ	16 (.0598")	638
SJ	14 (.0747")	638

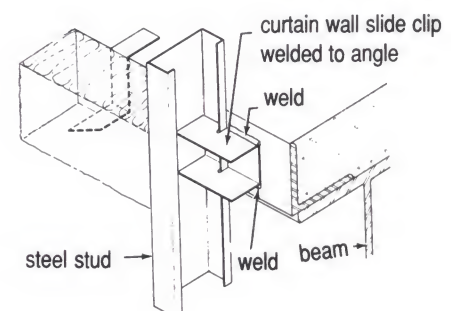
*ST and SN studs Fy = 33.0 ksi

**SJ Fy = 40.0 ksi

Curtain wall slide clip



Curtain wall slide clip attachment



The Lovely Curtain Wall Slip Anchor facilitates curtain wall attachment to horizontal structure supports while allowing for vertical movement of the structure.

Consisting of two plates, the Lovely Curtain Wall Slip Anchor aligns studs accurately, maintaining tolerances within $\frac{1}{8}$ ". The bottom plate bridges the distance while the top plate pinches the stud. There is no need for build-out. Anchor is welded to a structural steel horizontal surface.

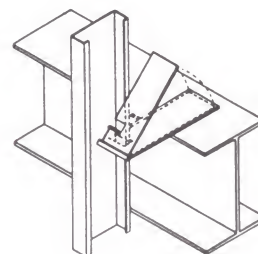
Size (in.) top — $3\frac{1}{2} \times 11\frac{1}{2} \times 14$ ga.
bottom — $4 \times 12\frac{1}{2} \times 14$ ga.
Weight 1.75 lbs (0.80 kg)

Table 41

**Lovely Slip Anchor:
Allowable Design Loads**

Stud Gauge/ Thickness	Safe Design Load (lbs)
20 ga.	204
18 ga.	350
16 ga.	423
14 ga.	503

Lovely Curtain Wall Slip Anchor



CONTROL JOINTS

Curtain wall and interior partition wall surfaces should be isolated with control joints or other means where:

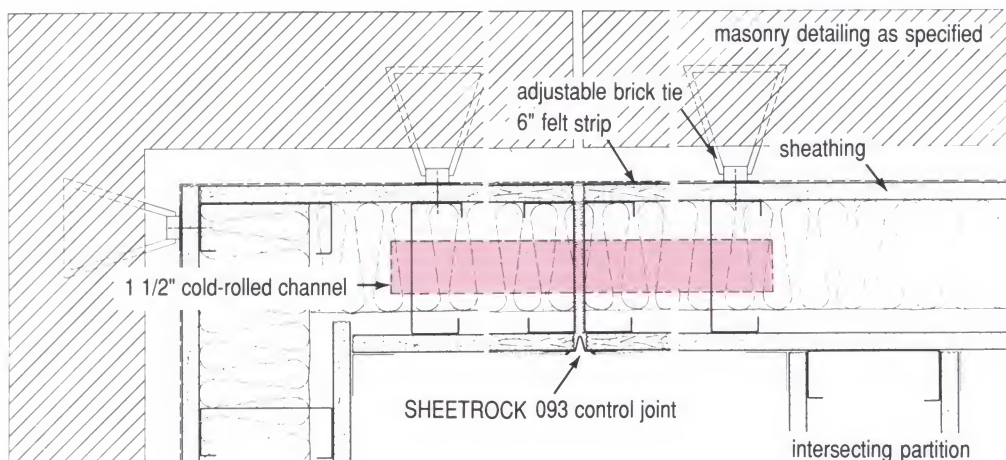
1. A curtain wall abuts a structural element (except floor) or dissimilar wall or ceiling;
2. Construction changes within the plane of the wall;
3. Stucco surfaces exceed 10' in either direction;
4. The area within stucco sections exceeds 100 sq. ft.;
5. Required for brick-veneer construction by the Brick Institute of America especially below ledger angle supports;
6. Basic construction contains a control joint;
7. Interior partition run exceeds 30';
8. Exterior soffits exceed 30' in either direction.

Ceiling height door frames may be used as control joints. Less than ceiling height door frames should have control joints extending to the ceiling from both corners.

Framing at control joints that extend through the wall should have $1\frac{1}{2}$ " cold-rolled channel alignment stabilizers spaced a maximum of 4' o.c. Channels should be placed through holes in the stud web and be securely attached to the first stud on each side of the control joint.

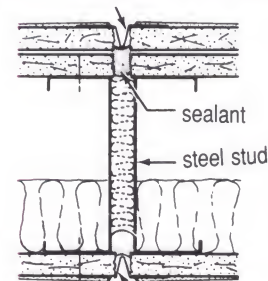
These recommendations are not complete for installation of control joints. Contact sheathing, gypsum board and exterior facing manufacturers for complete details and recommendations.

Exterior control joint (example showing brick veneer)



Interior control joint

SHEETROCK 093 control joint



SHEETROCK 093 control joint

Properly spaced horizontal steel bracing provides resistance to stud rotation and minor axis bending under wind and axial loads. Both stud flanges must be attached to top and bottom runner flanges to provide proper end support. Floor and ceiling runners must also be securely anchored to the structure. To fully utilize the stud's load carrying capacity, horizontal bracing must be installed at proper intervals.

Values in Axial Combined Load Tables are based on studs laterally braced with mechanical bracing installed at a maximum of 48" o.c. For allowable loads for studs with other than bracing 48" o.c., contact the Unimast Technical Departments. AISI Specifications, Section D4, contain methods for calculating the allowable axial loads using gypsum board or sheathing for lateral bracing. Unimast suggests the use of mechanical bracing, 48" o.c., for axially loaded studs, to ensure studs are properly braced during construction and/or remodeling when gypsum board or sheathing may not be present.

Lateral bracing consists of a field

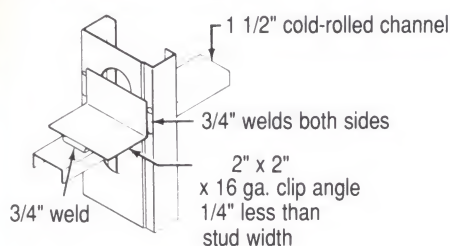
cut CR runner for solid bridging and steel strap bracing on both sides of the studs. Solid bridging is placed at each end of the wall, adjacent to wall openings and 8' o.c. maximum. The solid bridging consists of a runner section with the web flange bent at each end which is then secured to each stud flange. Strap bracing, 1½" wide and 20-gauge, is fastened to each stud flange with one screw and to each solid bridging runner section with four screws.

As an alternate, 1½" cold-rolled channels may be used to brace studs laterally. Channels are inserted through the stud web holes and secured with screw-attached or welded 2" x 2" x 16-gauge clip angles cut-to-length ¼" less than the stud width. For studs 3⅝" or smaller, 16 gauge or heavier, the channel may be secured by welding both channel flanges to the stud.

Adequate lateral bracing must be provided during construction. One of the two methods described above, 1½" cold-rolled channel or horizontal strap bracing, should be installed immediately after the studs are erected to prevent stud failure.

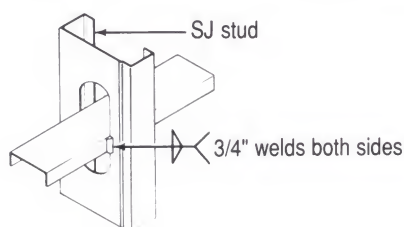
Lateral bracing weld attachment

(3 5/8" thru 8" members)



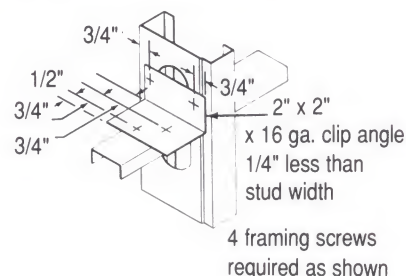
Lateral bracing weld attachment

(3 5/8" or smaller members in 16 ga. or heavier thickness)

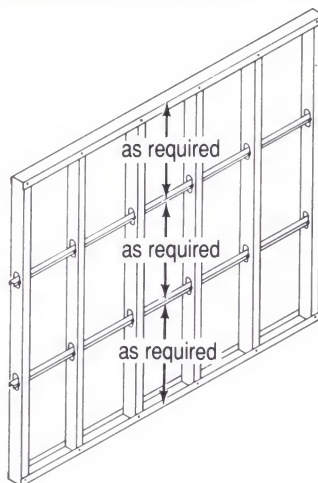
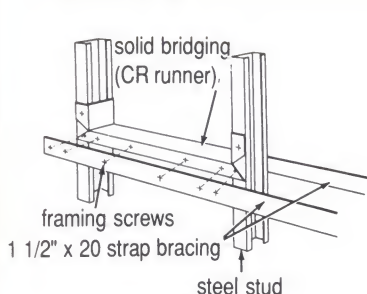


Lateral bracing screw attachment

(3 5/8" thru 8" members)



Solid bridging



Buildings must be properly braced to resist racking under wind and seismic loads. In steel-framed construction, diagonal strap bracing offers an economical and effective means to provide this resistance. Straps are sloped to resist racking forces in tension. They are installed over framing members and easily covered with facing materials.

The ends of diagonal straps are readily secured by screws or welds to transfer the tension load to the wall framing

and floor assembly. End connections must be designed to transfer accumulated design loads. At the foundation, floor anchors must be adequate to prevent uplift and horizontal shear.

Diagonal bracing and connections must be designed for the specific conditions of a building. For allowable load capacities of Unimast members and assistance in developing connections, contact Unimast Technical Service Departments.

Table 42

Racking Bracing: Allowable Tension Capacity

Flat strap bracing (thickness)	Tension capacity (lb) ⁽¹⁾	Weld length (in) ⁽²⁾	1:1 slope (45°)	2:1 slope (63.5°)	
			Horizontal and vertical component (lbs)	Horizontal component (lbs)	Vertical component (lbs)
Flat strap bracing					
3"x14-ga. (.0697")	5,509	5¾	3,895	2,458	4,930
4"x14-ga. (.0697")	7,346	7½	5,194	3,278	6,574
5"x14-ga. (.0697")	9,182	9½	6,492	4,097	8,217
3"x16-ga. (.0548")	4,332	5¾	3,063	1,933	3,877
4"x16-ga. (.0548")	5,775	7½	4,083	2,577	4,625
5"x16-ga. (.0548")	7,219	9½	5,104	3,221	6,461

(1) Tension capacities based on steel having a design stress of 19.8 ksi. Yield strength (F_y) is 33 ksi. Ultimate strength of 35.64 ksi. Allowable stress increased 33% for wind and seismic loading. (2) Weld length is the minimum length of longitudinal fillet weld at each end of strap to develop tension capacity of strap.

Diagonal racking bracing

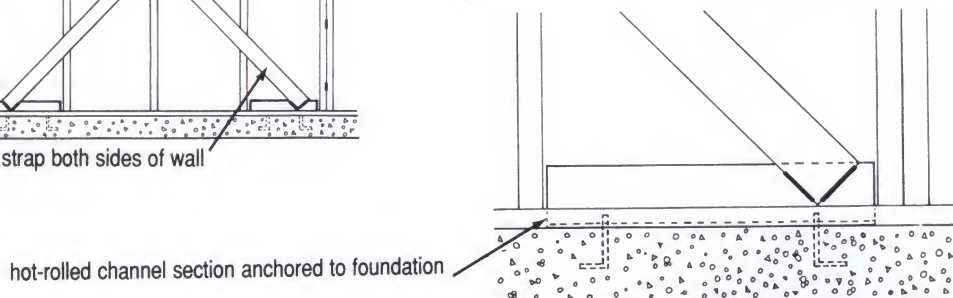
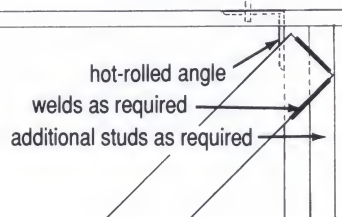
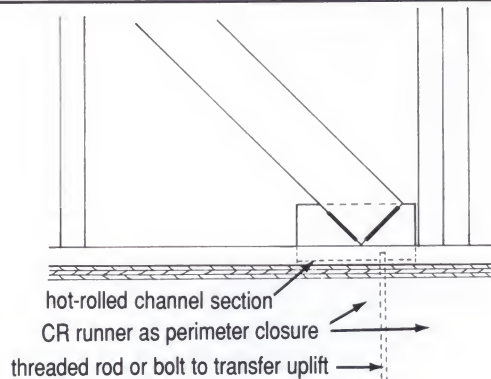
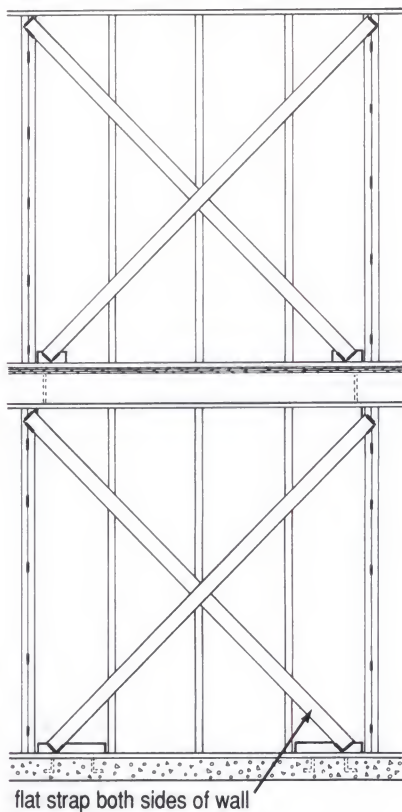


Table 43

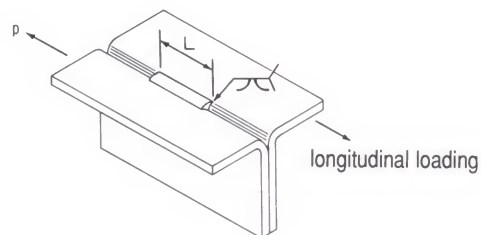
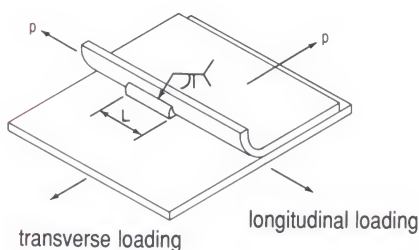
Welds: Allowable Loads (lb/in)⁽¹⁾

Gauge ⁽²⁾	Design thickness (in)	Weld size (in)	Fillet		Flare bevel-groove		Flare v-groove
			Longitudinal	Transverse	Longitudinal	Transverse	Longitudinal
18	.0478	1/8	511	681	511	568	511
16	.0598	1/8	640	853	640	710	640
14	.0747	1/8	799	1065	799	887	799
12	.1046	1/8	1118	1491	1118	1242	1118

(1) Loads based on steel having 33 ksi yield strength and 1.08 F_y tensile strength developed according to 1986 AISI Design Specifications and may be increased 33% for wind or seismic loads. When joining different gauge members, use load shown for lighter gauge. Loads are based on the thinnest metal in the attachment.

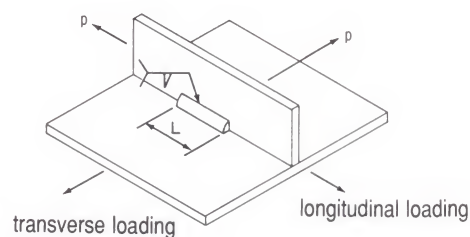
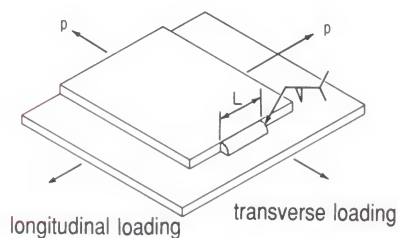
Flare-bevel groove weld

Flare V-groove weld



Lap joint fillet weld

T-joint fillet weld



Field welding of light steel framing members.



Table 44

SUPER-TITE Screws: Allowable Loads (lbs/fastener)⁽¹⁾

Gauge ⁽²⁾ (thickness)	3/4" Driller HWH 80S (14 x 3/4)		5/8" Driller Pan Head 35S (10 x 5/8)		7/16" Driller Pan Head 23S (7 x 7/16)	
	Shear	Pullout	Shear	Pullout	Shear	Pullout
22 (.0299")	187	103	170	60	142	55
20 (.0344")	213	113	193	72	163	62
18 (.0478")	327	123	273	110	223	100
16 (.0598")	420	175	343	150	N/A ⁽³⁾	N/A ⁽³⁾
14 (.0747")	577	260	402	210	N/A ⁽³⁾	N/A ⁽³⁾

(1) Factor of safety of 3.0 used. Values based on steel having a 33 ksi yield strength. Values for other steels are directly proportional to yield strengths. Values for shear also apply to bearing. (2) Loads are based on the thinnest metal in the attachment. (3) N/A-two steel thicknesses of this gauge can not be connected by this size screw.

Table 45

Bulldex Screws: Allowable Loads (lbs/fastener)⁽¹⁾

Gauge ⁽²⁾ (thickness)	No. 1/4-14 D = .188" T = .205"		No. 12-14 D = .160" T = .177"		No. 10-16 D = .138" T = .153"		No. 8-18 D = .120" T = .125"		No. 6-20 D = .104" T = .106"	
	Shear	Pullout	Shear	Pullout	Shear	Pullout	Shear	Pullout	Shear	Pullout
20 (.0359")	154	71	143	71	141	69	140	68	133	53
18 (.0479")	301	101	276	101	263	98	248	94	188	83
16 (.0598")	426	159	377	153	261	151	236	142	N/A ⁽³⁾	N/A ⁽³⁾
14 (.0747")	511	242	412	215	286	205	N/A ⁽³⁾	N/A ⁽³⁾	N/A ⁽³⁾	N/A ⁽³⁾
12 (.1046")	585	352	450	324	327	314	N/A ⁽³⁾	N/A ⁽³⁾	N/A ⁽³⁾	N/A ⁽³⁾

(1) Allowable loads based on Bulldex Report #845. Loads based on steel having 33 ksi yield strength and 1.08 Fy tensile strength. Loads are based on average test results divided by a factor of safety of 3.0. These may be increased by 33% for wind and seismic loads. (2) Loads are based on the thinnest metal in the attachment. (3) N/A-two steel thicknesses of this gauge can not be connected by this size screw.

Table 46

Power Driven Fasteners in Concrete: Allowable Loads (lbs/fastener)⁽¹⁾

Shank diameter	Minimum penetration	Type of loading	Concrete compression strength (psi)		
			2000	3000	4000
0.145"	1 1/8"	Shear	160	225	265
		Pullout	90	115	145
0.177"	1 7/16"	Shear	250	285	330
		Pullout	150	205	275
0.205"	1 1/4"	Shear	390	445	500
		Pullout	220	280	345

(1) Values are for lightweight or hard rock concrete. Allowable shear and pullout values are based on Hilti ICBO Research Report #2388. Minimum fastener spacing is 4" o.c. and minimum edge distance is 3".

Table 47a

Power Driven Fasteners in Structural Steel: Allowable Bearing Capacity (lbs/fastener)⁽¹⁾

Shank diameter	Steel thickness				
	20 gauge (.0344")	18 gauge (.0478")	16 gauge (.0598")	14 gauge (.0747")	12 gauge (.1046")
0.145"	189	263	329	411	576
0.177"	231	321	402	502	702
0.205"	267	372	465	581	814

(1) Bearing capacity is based on $F_u = 1.15 \times 33.0$ ksi. Allowable bearing capacity calculated per Section E 3.3 of the 1986 AISI Design Specifications.

Table 47b

Power Driven Fasteners in Structural Steel: Allowable Pull-out and Shear (lbs/fastener)⁽¹⁾

Cold rolled steel gauge	0.145" Shank Diameter			0.177" Shank Diameter			0.205" Shank Diameter		
	Hot Rolled Steel Thickness			Hot Rolled Steel Thickness			Hot Rolled Steel Thickness		
	1/4"	3/8"	1/2"	1/4"	3/8"	1/2"	1/4"	3/8"	1/2"
12 (.1046")	210	210	210	335	395	395	485	525	660
14 (.0747")	210	210	210	335	395	395	485	525	581
16 (.0598")	210	210	210	335	395	395	465	465	465
18 (.0476")	210	210	210	321	321	321	372	372	372
20 (.0344")	197	197	197	241	241	241	279	279	279

(1) Shear values are based on Hilti ICBO Research Report No. 2388. Tests were conducted with the fastener point driven completely through the back side of the hot rolled steel member. This was necessary to obtain proper gripping force.

1.0 General

2.0 Products

2.1 Materials

2.1.1 All studs and/or joists and accessories shall be made of the type, size, gauge and spacing shown on the drawings, and shall be manufactured by Unimast Incorporated.

2.1.2 All structural members shall be designed in accordance with American Iron and Steel Institute (AISI) "Specification for the Design of Cold-Formed Steel Structural Members," 1986 edition.

2.1.3 All structural members shall be formed from corrosion-resistant steel, corresponding to the requirements of ASTM A446, with a minimum yield strength of 40 ksi (50 ksi) (33 ksi) for SJ studs and Grade A, 33 ksi, for CR runners.

2.1.4 All structural members shall be zinc coated meeting ASTM A525.

3.0 Execution

3.1 Fabrication

3.1.1 Prior to fabrication of framing, the contractor shall submit fabrication and erection drawings to the architect or engineer to obtain approval.

3.1.2 Prefabricated panels shall be square, with components attached in a manner to prevent racking and to minimize distortion while lifting and transporting.

3.1.3 All framing components shall be cut squarely for attachment to perpendicular members or, as required, for an angular fit against abutting members.

3.1.4 All framing components shall be plumbed, aligned and leveled.

3.1.5 In all doubled jamb studs and doubled headers not accessible to insulation contractors, insulation equal to that specified elsewhere shall be provided.

3.1.6 Fastening of components shall be with self-drilling screws or welding. Screws and welds shall be of sufficient size to ensure the strength of the connection. Wire tying of components shall not be permitted. All welds shall be touched-up with a zinc-rich paint.

3.1.7 Splices in framing components, other than runner track, shall not be permitted.

3.1.8 Abutting lengths of runner shall be butt-welded, spliced or each length securely anchored to a common structural element.

Runners shall be securely anchored to the supporting structure as shown on the drawings.

3.1.9 Temporary bracing, where required, shall be provided until erection is complete.

3.2 Installation

(nonload-bearing) curtain walls

3.2.1 Studs shall be secured to continuous runner tracks unless the stud end terminates at deflection track.

3.2.2 Installation of curtain wall framing shall accommodate vertical displacement of () of the primary frame. This shall include slide clips and deflection slip tracks as shown on the drawings.

3.2.3 Framing of wall openings shall include headers and jambs as shown on the drawings.

3.3 Installation (axial load-bearing walls)

3.3.1 Axially loaded studs shall be installed so the ends are positioned against the inside of the runner track web prior to fastening and shall be attached to both flanges of the upper and lower runner tracks.

3.3.2 Complete, uniform and level bearing support shall be provided for the bottom runner.

3.3.3 Framing of wall openings shall include headers and supporting studs as shown on the drawings.

3.3.4 Resistance to bending and rotation about the minor axis shall be provided by horizontal strap and blocking or cold-rolled channel bracing as shown on the drawings.

3.3.5 Diagonally braced stud walls, as indicated on the drawings, shall be provided at locations designated as "shear walls" for frame stability and lateral load resistance. Additional studs, when necessary, shall be positioned as indicated on the drawings and adequately attached to the structure to resist the vertical components of the loads.

3.4 Installation (joists)

3.4.1 Uniform and level joist bearing shall be provided at the foundation walls by means of shims and/or nonsettling grout.

3.4.2 Joists shall be located directly over bearing studs, or a load distribution member shall be provided at the top of the bearing wall.

3.4.3 Web stiffeners shall be provided at reaction points and/or at points of concentrated loads where indicated on the drawings.

3.4.4 Joist bridging shall be provided where indicated on the drawings.

3.4.5 Additional joists shall be provided under parallel partitions when the partition length exceeds one-half the joist span, and around all floor and roof openings which interrupt one or more spanning members, unless otherwise noted.

3.4.6 End blocking shall be provided where joist ends are not otherwise restrained from rotation.



Design requirements are easily met with steel framing.

Calculations for both stud and joist tabular data in this publication are based on the following factors:

1. AISI "Specifications for the Design of Cold-Formed Steel Structural Members", 1986 edition.
2. Yield strength: 40,000 psi (40 ksi) for SJ studs, 33,000 psi (33 ksi) for CR runners and SN and ST studs. (Contact the Technical Service Department nearest you for information on 33 ksi and 50 ksi SJ studs.)
3. Structural and physical properties of members shown in Tables 2-15.

Joists

Conditions considered especially for joist allowable clear span and load tables (Tables 16 and 17) include:

1. Bending stress
2. Shear stress
3. Combined bending and shear stress
4. Web crippling
5. Combined bending and web crippling
6. Deflection

Calculations for joists also are based on:

- A. Joist compression flange fully braced.
- B. Minimum of 10" unpunched steel at the end supports.
- C. Double-span systems assume screw-attached joist reinforcement for a minimum distance of 0.1 span each side (total 0.2 span) of center support.

Studs

Conditions considered especially for stud axial and wind load tables (Tables 24-31) include:

1. Bending stress
2. Axial stress
3. Combined axial and bending stress
4. Shear stress
5. Wind load deflection including effect of axial load
6. Web crippling at supports
7. Slenderness ratio, not to exceed 300 for construction loads only (no lateral loads)
8. Slenderness ratio not to exceed 200 for laterally loaded studs and combined loaded studs (axial and lateral loads)

Calculations for studs also are based on:

- A. Lateral bracing provided by cold-rolled channels or horizontal straps spaced a maximum of 48" o.c. for axially loaded studs and by gypsum board or sheathing each side for laterally loaded studs only.

- B. Actual bending and axial stresses on studs multiplied by .75 in accordance with AISI Section A4.4.
- C. Web crippling based on test data for studs with minimum 10" unpunched steel at both ends of member; for 20 and 18-gauge studs having 20 and 18-gauge runner, respectively; and for 16 and 14-gauge studs using a minimum of 18-gauge runner. Web stiffening may be required when field cuts reduce this minimum 10" unpunched steel.

Product Availability

Unimast products are available from local United States Gypsum Company sales representatives and can be ordered through Unimast sales offices shown on back cover.

All products may not be available from all Unimast plant locations. Contact the sales office nearest you for specific product availability.

Literature

Unimast Incorporated product catalogs are available from Unimast sales offices. Contact the one nearest you for any of the following literature:

CS-13	Steel Framing Components and Accessories for Drywall, Plaster and Load-bearing Construction
UN-29	Certification of Material
UN-30	Steel Framing Systems—Product and Technical Information
UN-31	Plastering Steel Products and Accessories
UN-32	Drywall Steel Products and Accessories
UN-4	Unimast Incorporated Capabilities Brochure

Unimast products also are included in literature published by United States Gypsum Company. The following catalogs are available from U.S. Gypsum sales offices:

SA-100	USG Construction Selector
SA-920	Plaster Products, Accessories and Systems
SA-923	Drywall/Steel Framed Systems

Product and system design information is also available in Sweet's Catalog sections 09200, 09250 and 05400.



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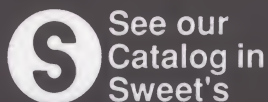
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Unimast Incorporated acknowledges Professor Karl H. Klippstein, P.E., University of Pittsburgh, Structural Engineering Consultant, and Matsen Ford Design Associates, Inc., Pewaukee, Wisconsin, and Baltimore, Maryland, for assistance in preparing the technical information.

All details, specifications and data computations contained in this literature are intended as a general guide for use in construction. These products must not be used in the design or construction of any structure without complete and detailed evaluation by a qualified engineer or architect to verify the suitability of these particular products for use in any given structure. Because physical properties among competitive products vary, information from this publication should be used only with Unimast studs and runners. Unimast Incorporated assumes no liability for failure resulting from the use of its drawings, specifications or computations or for failure resulting from the use of alternative materials or improper application or installation.

USG Exterior Products and Systems



**For new residential and commercial buildings
plus repair and remodel applications**



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Depend on the company that has been producing quality building materials for over 90 years for exterior products and systems to meet your design needs.

On the cover: The Courtyard Shops, Encino, Calif.; Residence, Chicago, Ill.; Residence, Goose Pimple Junction, Va.

*Left: CLA Building, California State Polytechnic University, Pomona, Calif.
Below: First National Bank of East Chicago, Schererville, Ind.*



USG Offers a Full Line of Quality Exterior Products and Systems

USG Exterior Systems employ a wide range of exterior products to offer architects and builders lightweight, fire-resistant assemblies. And these exterior products and systems come from the same company that has been providing quality building materials for over 90 years.

Utilizing conventional materials, methods and equipment, these high-performance systems are suitable for many types of structures: light commercial (office buildings, hotels, motels, stores and shopping centers); institutional (schools, clinics, hospitals and nursing homes); residential (apartments, townhouses and homes); and industrial buildings (factories and warehouses).

USG Exterior Systems include USG EIFS, DUROCK EIFS, DUROCK Exterior Systems, and conventional gypsum sheathing systems. These systems provide a wide choice of architectural style, color and texture, while minimizing variance of cost and performance.

So depend on United States Gypsum Company to provide you with the right products, systems and recommendations for the exterior of your next project.

Reasons to Select USG Exterior Systems

Total System Responsibility—United States Gypsum Company provides all the components of many of the USG Exterior Systems: substrates, adhesives, meshes, basecoats, finishes and accessories. You can rely on the systems employing these components to perform as described and you can depend on complete support from our representatives throughout the country.

Superior Performance—USG Exterior Systems have been extensively in-house and independent laboratory tested. Resistance to wind loads, water permeance, cyclic freezing and thawing, and weathering were evaluated. The result is a set of products, systems and specifications that are designed to perform. And that reassurance is more important than ever in exterior assemblies.

Fire Resistance—Both 1- and 2-hour fire-resistance ratings are achieved with exterior systems on wood or steel studs.

Lightweight—USG Exterior Systems can be applied over wood or steel framing and provide a similar appearance but weigh considerably less than masonry or precast or poured concrete, reducing structural requirements.

Low In-Place Cost—Labor time required and installed cost are less than many other exterior systems. Substrate panels install easily and buildings can be closed-in quickly, allowing interior construction to proceed.

Finish Options and Detailing—USG Exterior Textured Finish is designed to integrate with a variety of exterior systems on the same wall. For example, the DUROCK Exterior Systems may be clad with brick or stone veneer, siding, and wood shingles, to complement the stucco look finish. In addition, layering DUROCK Cement Panels or applying insulation board shapes can provide esthetic detailing with design options such as quoins, lintels, dentils, banding and keystones.

Warranties—Products and systems provided by United States Gypsum Company are warranted to be free from defects in material and workmanship. Contact United States Gypsum Company sales office for complete details.

Residence, Mobile, Ala.



Substrates

DUROCK Cement Board/DUROCK Exterior Cement Board

Description: Aggregated portland cement board with polymer-coated, glass-fiber mesh embedded in back and front surfaces. Panels are fully cured before shipment. Ends are square cut and edges reinforced and finished smooth. Provide a superior base for USG Exterior Textured Finish, thin brick, ceramic tile, exposed aggregate or EIFS. Allowable wind loads: 30 psf. max. for DUROCK Cement Board; 40 psf. max. for DUROCK Exterior Cement Board.

Thicknesses: ½" and ¾".

Length: 8'. Other lengths available upon request.

Widths: 32" for DUROCK Cement Board; 48" for DUROCK Exterior Cement Board. Other widths available upon request.

Weights: Approx. 3.0 psf for ½"; 3.75 psf for ¾".

Packaging: Shipped palletized, 30 sheets per pallet. Each pallet is stretch-wrapped and identified with pallet labels.

SHEETROCK brand Gypsum Sheathing

Description: Consists of a fire-resistant, treated core encased in water-repellent paper on both sides and long edges. Ideal for use in exterior steel or wood framed construction on single-family housing, apartments, motels and light commercial buildings. With conventional exterior stucco, sheathing provides flatter walls, more uniform plaster thickness.

Thicknesses: ½" regular, ¾" FIRECODE Core.

Lengths: 8' and 9'.

Widths: 24" and 48".

Weights: Approx. 1.9 psf for ½" thickness; 2.3 psf at ¾" thickness.

Packaging: 2 pcs./bundle.

GYP-LAP Gypsum Sheathing

Description: Non-treated core panel designed to combine excellent performance with exceptional economy. Noncombustible gypsum core adds fire safety not available with plywood or wood-fiber sheathing. Clad in water-repellent paper on face and back surfaces. Primarily available in the western United States.

Thicknesses: ½" regular, ¾" FIRECODE Core.

Length: 8'.

Widths: 24" and 48".

Weights: Approx. 1.8 psf for ½" thickness; 2.2 psf at ¾" thickness.

Packaging: 2 pcs./bundle.

USG Triple-Sealed Gypsum Sheathing

Description: The lowest-cost sheathing available from United States Gypsum Company. Non-treated gypsum core adds fire safety not available with plywood or wood-fiber sheathing. Clad in water-repellent paper on face, back and long edges; ends are coated with special waterproofing compound. Primarily available in the southwestern United States.

Thickness: ¾" regular.

Lengths: 8' and 9'.

Widths: 48".

Weight: Approx. 1.7 psf.

Packaging: Shipped unbundled.

Insulation Boards

USG Exterior Insulation Board

Description: An aged expanded polystyrene (EPS) board providing outstanding thermal performance and excellent water-resistance. Board has a nominal density of 1.0 pcf and is aged in accordance with ASTM C578.

Thicknesses: Available in thicknesses from ¾" to 4".

Size: 2'x4' pieces.

Packaging: 1"—18 pcs., 192 ft.²; 1½"—12 pcs., 128 ft.²; 2"—9 pcs., 98 ft.²; 4"—6 pcs., 48 ft.². Other sizes available.

Reinforcing Meshes

USG Exterior Standard Reinforcing Mesh

Description: Open-weave, glass fiber fabric treated for alkaline resistance and designed to reinforce the basecoat matrix in exterior finish systems.

Weight: Approx. 4.5 oz./yd.².

Packaging: 38"x50-yd. rolls, 4 per carton; 75 lbs. per carton.

USG Exterior Heavy-Duty Reinforcing Mesh

Description: A heavy-duty open weave, glass fiber fabric. Ideal for use in areas where high impact resistance is desired.

Weight: Approx. 22 oz./yd.².

Packaging: 38"x25-yd. rolls, 2 per carton; 77 lbs. per carton.

USG Exterior Detail Mesh

Description: A relaxed glass fiber fabric ideal for use in areas that require tight radius bends or sharp angles and for performing back-wrapping operations.

Weight: Approx. 4.5 oz./yd.².

Packaging: 9½"x50-yd. rolls, 16 per carton; 75 lbs. per carton.

Basecoats and Adhesives

USG Exterior Basecoat

Description: A ready-to-mix portland cement mortar containing dry latex polymers. Available in regular formulation or, for areas that require levelling, in fiber-reinforced formulation. This product trowels easily and provides a smooth surface for finish application. Designed for embedding mesh in USG EIFS and for preparing various surfaces for USG Exterior Textured Finish. Also used as foam insulation adhesive.

Approximate Coverage: As an EIFS basecoat, 90-100 ft.² per bag at ¾" wet state thickness when applied using a standard trowel. As a basecoat and joint filler for DUROCK Cement Board Panel, 80-90 ft.² per bag where applied using a standard trowel at ¾" thickness. As an adhesive, 120-140 ft.² per bag where applied using a U-notched trowel having notches ½" deep by ¾" wide spaced 1½" apart.

Packaging: 50 lb. net wt. bag.

USG Exterior Ready-Mixed Basecoat

Description: A noncementitious ready-to-use basecoat designed for use with the DUROCK Direct-Applied Exterior Finish System, especially over steel framing. Ideal for applications where blending materials is difficult at the jobsite. This polymer-based product provides enhanced water- and crack-resistance.

Approximate Coverage: 200-300 ft.² per pail where applied using a U-notched trowel having notches ¾" deep by ¼" wide spaced ½" apart.

Packaging: 60 lb. pail.

USG Exterior Insulation Board Adhesive

Description: A ready-to-use water-based acrylic copolymer adhesive. It is ideal for adhering USG Exterior Insulation Board to wood-based and other exterior grade glass-faced sheathings. Provides a long-lasting resilient grip.

Approximate Coverage: 200-300 ft.² per pail where applied using a U-notched trowel having notches ¾" deep by ¾" wide spaced ¾" apart.

Packaging: 43 lb. net wt. pail.

USG Exterior Acrylic Component

Description: An acrylic polymer that, when combined with portland cement, adheres USG Exterior Insulation Board to cement board, concrete, stucco, masonry and, when used in conjunction with mechanical fasteners, exterior gypsum sheathing. Also used to embed EIFS mesh.

Approximate Coverage: As an adhesive, 280-320 ft.² using a U-notched trowel having notches ½" deep by ¾" wide spaced 1½" apart; as a basecoat at ¾" wet state thickness, 240-260 ft.². Coverages are per 65-lb. pail of component when combined with equal parts portland cement.

Packaging: 65 lb. pail.

USG Exterior Basecoat Retarder

Description: Retards the set of USG Exterior Basecoat. Allows machine mixing and spraying. Use one bag of Retarder for each bag of USG Exterior Basecoat.

Packaging: 25 bags per carton; 7 lbs. per carton.

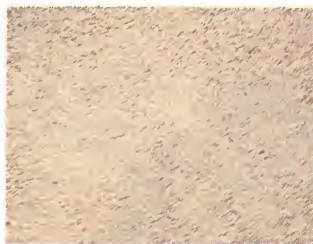
Exterior Finishes**USG Exterior Textured Finish**

Description: A fade- and weather-resistant finish that is available in a dramatic range of standard and custom colors. All colors are lead-free and alkali-resistant. This coating is based on a 100% acrylic polymer emulsion. It is flexible and accommodates thermal expansion and contraction without delamination under normal conditions. In fine, medium or coarse finish (shown below).

Approximate Coverage: For fine finish, 150-175 ft.²/pail; for medium finish, 125-150 ft.²/pail; for coarse finish, 100-125 ft.²/pail. Coverage varies with finish and texture. Minimum coating thickness $\frac{1}{8}$ ".

Colors: Full range of custom colors available on request.

Packaging: 67.5 lb. net weight pail.



USG Exterior Textured Finish
Fine Finish



USG Exterior Textured Finish
Coarse Finish



USG Exterior Stone Finish
Silver Stone



USG Exterior Stone Finish
Sand Stone



USG Exterior Stone Finish
Rose Quartz



USG Exterior Stone Finish
Granite



USG Exterior Stone Finish
Forest Green

USG Exterior Stone Finish

Description: Provides the look of stone at a fraction of the cost and weight. It is based on a 100% acrylic polymer emulsion and formulated to rock-solid performance standards. These exterior finishes can be applied in a variety of textures which provide a range of surface finishing options from subtle to bold. The applicator has the flexibility to create a variety of texture patterns and to combine different patterns on the same surface.

Approximate Coverage: 125-150 ft.² per pail.

Colors: 5 colors (shown below, left).

Packaging: 67.5 lb. pail.

ORIENTAL Exterior Stucco Finish

Description: An all-weather exterior water-resistant portland cement based stucco finish. Compatible only with portland cement-lime base coats. It is mill-prepared, requires adding only water to ready it for hand or spray application of float, texture, stipple, sponge, spatter-dash or rough coat (but not smooth trowel) finishes.

Approximate Coverage: 55-75 ft.² per bag when applied $\frac{1}{8}$ " thick.

Colors: Available in white and 15 other colors (Southwest only).

Packaging: 80 lb. bag.

USG Exterior Over-Coat Finish

Description: An acrylic polymer emulsion coating for re-coating and touch-up of USG Exterior Textured Finish or other exterior stucco finishes. Ready to use for brush, roller, spray application.

Colors: Available in same colors as USG Exterior Textured Finish.

Approximate Coverage: 175-200 ft.² per gallon. Will vary depending on the color, surface and method of application.

Packaging: 46 lb. pail.

Accessories**DUROCK Wood and Steel Screws**

Description: Wafer head design provides greater holding power. Special coating provides corrosion resistance.

For 14 to 20-ga. Steel Framing: $\frac{1}{4}$ " and $\frac{1}{2}$ " DUROCK Steel Screws.

For Wood Framing: $\frac{1}{4}$ ", $\frac{1}{2}$ " or $\frac{3}{4}$ " DUROCK Wood Screws.

Packaging: $\frac{1}{4}$ " screws, 5,000 pieces per carton; $\frac{1}{2}$ " screws, 4,000 pieces per carton; $\frac{3}{4}$ " screws, 2,000 pieces per carton.

DUROCK Exterior Tape

Description: Polymer-coated, open mesh, glass-fiber tape.

Packaging: 4 rolls per carton, 150 linear ft./roll, 4" wide.

DUROCK Latex Fortified Mortar

Description: Ready-to-mix, thin-set mortar containing dry latex polymers, white or gray.

Approximate Coverage: For thin brick and tile systems: 40-50 ft.²/50 lb. bag for $\frac{1}{8}$ " thick leveling/skim coat; 80-90 ft.²/50 lb. bag for $\frac{1}{4}$ "x $\frac{1}{4}$ " notched trowel bond coat (back buttering not included).

Packaging: 50 lb. bag.

DUROCK Latex Fortified Grout

Description: Ready-to-mix grout containing dry latex polymers.

Colors: Designer White or Natural Gray. Custom colors available.

Approximate Coverage: For tile systems: 60-80 ft.²/50 lb. bag for $\frac{1}{2}$ " x 6" x 6" tile with $\frac{3}{16}$ " wide joints. For thin brick systems: 30-45 ft.²/50 lb. bag for $\frac{1}{2}$ "x 2 $\frac{1}{4}$ " x 8" thin brick with $\frac{3}{16}$ " wide joints.

Packaging: 50 lb. bag.

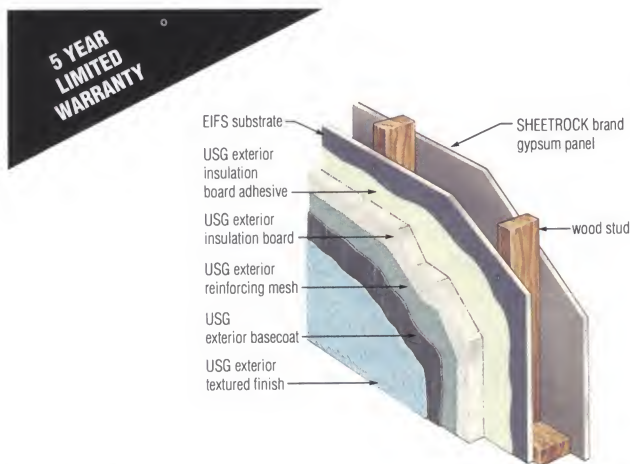
USG EIFS...

Provides an Economical, Highly-Insulating Exterior System

The USG EIFS consists of USG Exterior Insulation Board attached to a substrate and covered with a layer comprised of USG Exterior Basecoat/USG Exterior Reinforcing Mesh that bonds to the insulation board and is finished with a decorative, protective textured acrylic stucco coating. All components are provided by United States Gypsum Company. The system provides an economical, energy-efficient, architecturally pleasing alternative to conventional stucco applications.

USG EIFS is a polymer-based type system that can be applied to a variety of supporting substrates including cement board, concrete, unit masonry, wood-based panel sheathings, or other suitable exterior grade panel sheathing products. USG EIFS is a barrier-type system designed to prevent the intrusion of exterior elements into the wall cavity.

USG EIFS provides energy-efficient construction for a range of building types, is easily applied, and, when installed according to specifications, is warranted for five years by United States Gypsum Company.



For USG EIFS

- Substrate compatible with the USG EIFS is applied to framing.
- USG Exterior Insulation Board is bonded to substrate: with USG Exterior Insulation Board Adhesive for wood-based, glass-faced and other smooth-faced exterior grade sheathings; with USG Exterior Basecoat for cement board, block and concrete. Mechanical attachment, in addition to adhesive, is recommended over paper-faced gypsum sheathing.
- USG Exterior Basecoat and USG Standard Reinforcing Mesh are applied to a min. $\frac{3}{8}$ " thickness over rasped USG Exterior Insulation Board and allowed to cure. Heavy-duty mesh and detail mesh are also available.
- USG Exterior Textured Finish is trowel-applied in a minimum $\frac{1}{8}$ " thick, uniform layer over all basecoated surfaces. Finish is textured as required with plastic or wood floats.

USG EIFS Thermal Values

Type of Construction	No Insulation		1" Insulation		2" Insulation		3" Insulation		4" Insulation	
	R	U	R	U	R	U	R	U	R	U
Metal Stud	2.47	0.40	6.32	0.16	10.17	0.10	14.02	0.07	17.87	0.06
8" Concrete Block	1.21	0.58	5.56	0.18	9.41	0.08	13.26	0.08	17.11	0.06
8" Precast Concrete	1.24	0.87	5.09	0.20	8.94	0.11	12.79	0.08	16.64	0.06
Wood Stud	2.65	0.38	6.50	0.15	10.35	0.10	14.20	0.07	18.05	0.06

NOTE: R=3.6 for each 19; U=1/R.

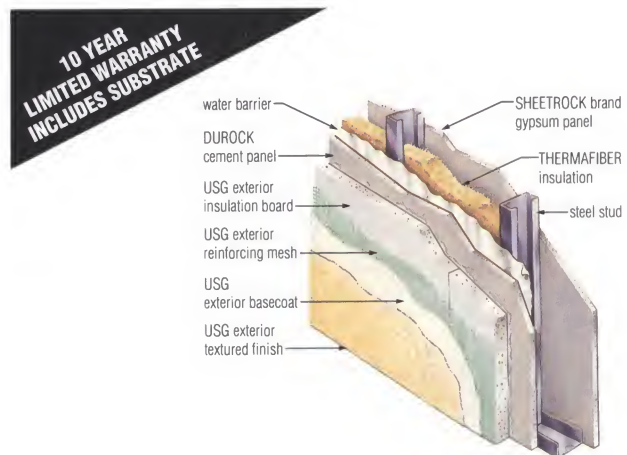
DUROCK EIFS...

Provides an EIFS with a High-Performance Substrate

DUROCK EIFS employs DUROCK Cement Panel as the substrate—a substrate which provides increased durability and bonding qualities when compared with other EIFS substrates. This makes the DUROCK EIFS the preferred choice for applications where long-term performance is critical.

DUROCK Cement Panels installed over both steel and wood framing were extensively evaluated both in-house and by independent laboratories. Resistance to wind loads, water permeance, bond strength after cyclic freezing and thawing, and weathering were evaluated to ensure that the DUROCK EIFS will not deteriorate or delaminate.

The DUROCK EIFS is designed to be weeped and flashed. It provides energy-efficient construction and integrates with other DUROCK Exterior Systems, including ceramic tile, thin-brick, epoxy matrix stone aggregate surfacing, stucco, or a combination of these finishes.



For DUROCK EIFS

- An approved water barrier is installed over the framing or stapled to back of DUROCK Cement Board.
- DUROCK Cement Panel substrate is applied to framing.
- USG Exterior Insulation Board is bonded to DUROCK Cement Panel with USG Exterior Basecoat.
- USG Exterior Basecoat and USG Standard Reinforcing Mesh are applied over rasped USG Exterior Insulation Board and allowed to cure. Heavy-duty mesh and detail mesh are also available.
- USG Exterior Textured Finish is trowel-applied in a minimum $\frac{1}{8}$ " thick, uniform layer over all basecoated surfaces. Finish is textured as required with plastic or wood floats.

USG EIFS and DUROCK EIFS Limitations

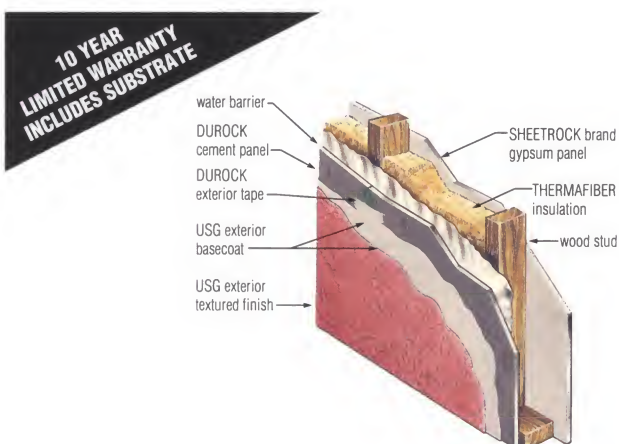
- 1 Maximum stud spacing shall be 24" o.c. for USG EIFS, 16" o.c. for DUROCK EIFS. Maximum allowable deflection, based on stud properties only, shall be L/240.
- 2 Systems may be used on sills with a 6 in 12 slope and up to 2'0" deep provided that adequate substrate support is provided, and the installation is adequately caulked and waterproofed.
- 3 USG EIFS are designed for buildings 4 stories tall or less. Contact your local United States Gypsum Company office for all applications beyond the scope of this literature.

DUROCK Direct-Applied Exterior Finish System...

Provides the Ultimate Impact-Resistance and Water-Resistance

The DUROCK Exterior Finish System provides a long-lasting, textured finish for exterior walls and ceilings. USG Exterior Textured Finish and USG Exterior Basecoat are applied directly over DUROCK Cement Panel. The texture coating is based on a 100% acrylic polymer emulsion and accommodates thermal expansion and contraction without cracking or delamination under normal conditions. System withstands high temperatures, humidity, water, wind and repeated freeze-thaw cycles.

The system allows for quicker occupancy, reduces labor and related costs. Installation time can be as little as 2 days with cement board installation, joint treatment and basecoat application done on the first day. The system is designed to be flashed and weeped in order to manage incidental water penetration.



For DUROCK Direct-Applied Exterior Finish System

- An approved water barrier is installed over the framing or stapled to back of DUROCK Cement Panel.
- DUROCK Cement Panel substrate is applied to framing.
- DUROCK Exterior Tape is embedded over all panel joints using USG Exterior Basecoat.
- USG Exterior Basecoat may be applied over DUROCK Cement Panel according to package instructions or for enhanced water- and crack-resistance, specifically over steel framing, DUROCK Exterior Ready-Mixed Basecoat can be used in lieu of USG Exterior Basecoat.
- USG Exterior Textured Finish is applied according to directions. It can be applied or finished in many common textures. Quoins, dentils, keystones, or other architectural elements can be installed over basecoated DUROCK Cement Panel and decorated with USG Exterior Textured Finish.

DUROCK Direct-Applied Cement Board Limitations

- 1 Systems using DUROCK Exterior Cement Board are designed for positive or negative uniform loads of up to 40 psf with studs spaced 16" o.c. max. Systems using DUROCK Cement Board are designed for positive or negative uniform loads up to 30 psf with studs spaced 16" o.c. max. For 40 psf loading, space screws max. 8" o.c.; for southern pine, space 1½" nails 8" o.c., 4" o.c. for spruce-pine-fir; 6" o.c. for 30 psf on spruce-pine-fir.
- 2 Maximum stud spacing: 16" o.c. for exterior wall assemblies, 24" o.c. for cavity shaft wall assembly; maximum allowable for deflection, based on stud properties only, L/360 for tile and thin brick finishes, L/240 for DUROCK Exterior Finish.

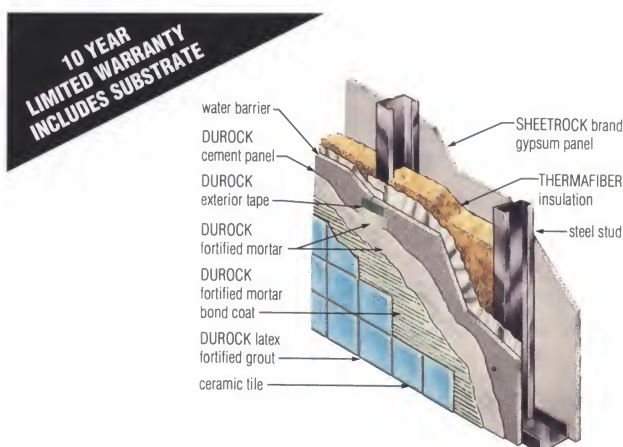
- 3 DUROCK Exterior Systems finished with ceramic tile, thin brick, epoxy matrix stone aggregate, DUROCK Exterior Finish and DUROCK EIFS may be used on sills with a 6 in 12 slope and up to 2'0" deep provided that the framing is 16" o.c., ½" minimum structural sheathing is placed behind the DUROCK Exterior Cement Board, and the installation is adequately caulked, flashed, waterproofed and weeped.
- 4 DUROCK Cement Panel may not be used as a structural sheathing; for racking resistance, separate bracing must be specified.
- 5 DUROCK Direct-Applied Exterior Finish System on steel framing must be laterally braced. To enhance crack-resistance, basecoating with USG Exterior Ready-Mixed Basecoat is recommended.

DUROCK Exterior Systems...

For Tile, Thin Brick and Aggregate Finishes

In addition to DUROCK EIFS and DUROCK Exterior Finish Systems, DUROCK Exterior Systems may be finished with ceramic tile, thin brick and epoxy matrix stone aggregate surfacing, or any combination of these finishes.

DUROCK Exterior Systems with tile and thin brick meet the requirements of the Ceramic Tile Institute and are included in its Tested Material List.



For DUROCK Exterior System with Other Finishes

- An approved water barrier is installed over the framing or stapled to back of DUROCK Cement Panel.
 - DUROCK Cement Panel substrate is applied to framing.
 - DUROCK Exterior Tape is embedded over all panel joints using USG Exterior Basecoat.
 - *For Tile and Thin Brick Systems*
DUROCK Latex Fortified Mortar or USG Exterior Basecoat—Fiber-Reinforced is applied 1/8" thick over the entire DUROCK Cement Panel surface. DUROCK Latex Fortified Mortar applied as the bond coat for ceramic tile and thin brick; and DUROCK Latex Fortified Grout used to fill joints between units.
 - *For Exposed Aggregate Systems*
Epoxy matrix finish with stone aggregate is applied over the entire DUROCK Cement Panel surface.
- NOTE: Consult manufacturer of ceramic tile, thin brick and aggregated epoxy matrix to determine its suitability as an exterior surface and to obtain complete application instructions.

DUROCK Cement Panel Systems

DUROCK Cement Panel Systems offer architects and builders lightweight, fire-resistant assemblies for steel-framed and wood-framed exteriors. Utilizing conventional materials, methods and equipment, these systems provide a wide choice of architectural style, color and texture, while minimizing variance of cost and performance. Exterior systems adapt easily to basic design concepts for both curtain walls—spandrel or in-fill panels including sloped sills, mechanical enclosures and parapets—and bearing walls—residential or commercial, wood or steel framing. In addition, layering DUROCK Cement Panels can provide esthetic detailing with design options such as quoins, lintels, dentils, banding and keystones. Both 1- and 2-hour fire-resistance ratings are achieved with wood or steel studs.

DUROCK Cement Panel Design Properties for ½" Thickness

Property	ASTM test ref.	Exterior cement board	Cement board
Flexural Strength - psi	C947-81	1000	750
Uniform load—psf (16" o.c. stud spacing)	—	40 max.	30 max.
Water Absorption - % by wt. 24 hrs	C473-84	10	10
Nail Pull Resistance - lb., 0.4" head diameter (wet or dry)	C473-84	125	125
Weight - psf	C473-84	3	3
Freeze/Thaw Resistance - Procedure B number of cycles with no deterioration	C666-84	100	100
Surface Burning Characteristics—flame/smoke	E84-84	5/0	5/0
Min. Bending Radius*—ft.	—	8	8

*Requires special framing.

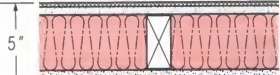
Thermal Properties

Thickness (in)	Product	"U"	"R"
3	THERMAFIBER SAFB	0.09	11.1
3½	THERMAFIBER FS-15	0.08	13.0
½	SHEETROCK brand Gypsum Panels	2.22	0.45
¾	SHEETROCK brand Gypsum Panels	1.79	0.56
½	DUROCK Cement Panel	3.85	0.26
1	USG Exterior Insulation Board	0.26	3.8


1-Hour Walls

Wood-Framed/Load Bearing


 THERMAFIBER Insulation


Detail/Physical Data	Description	Fire Test	Reference
	½" DUROCK cement panel and ½" ceramic tile exterior—board attached with 1½" DUROCK wood screws or 1½" hot dipped galvanized roofing nails 8" o.c.—2x4 studs spaced 16" o.c.—3½" THERMAFIBER FS-15 insulation between studs—½" SHEETROCK brand gypsum panels, FIRECODE core, or IMPERIAL FIRECODE gypsum base and ¼" IMPERIAL finish interior	UL Des U329	A

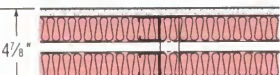
Steel-Framed/Load Bearing

	½" DUROCK cement panel—base layer ½" SHEETROCK brand gypsum panels, water-resistant, FIRECODE core—3½" 20-ga. min. studs 16" o.c.—3" THERMAFIBER SAFB—board att with 1½" DUROCK steel screws 8" o.c.—joints taped—½" SHEETROCK brand gypsum panels, FIRECODE core, interior	UL Des U473	B
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Steel-Framed/Non-Load Bearing

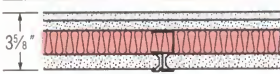
	½" DUROCK cement panel and ½" ceramic tile exterior—board screw-attached with 1½" DUROCK steel screws 8" o.c. to ¾" min., 20-ga. min. studs spaced 16" o.c.—3" THERMAFIBER SAFB insulation between studs—½" SHEETROCK brand gypsum panels, FIRECODE core, or IMPERIAL FIRECODE gypsum base and ¼" IMPERIAL finish interior	UL Des U442	C
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	½" DUROCK cement panel—1½" min., 20-ga. min. studs 16" o.c.—3" THERMAFIBER SAFB—board screw-attached with 1½" DUROCK steel screws 8" o.c.—joints taped—½" SHEETROCK brand gypsum panels, FIRECODE C core	UL Des U457	D
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	½" DUROCK cement panel—1½" min., 20-ga. min. studs 16" o.c. in two rows with horiz braces—1½" THERMAFIBER SAFB in both stud cavities—board screw-attached with 1½" DUROCK steel screws 8" o.c.—joints taped—½" SHEETROCK brand gypsum panels, FIRECODE C core	UL Des U458	E
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2-Hour Walls

Steel-Framed/Non-Load Bearing

	Cavity Shaft Wall—½" DUROCK cement panel—½" SHEETROCK brand gypsum panels, FIRECODE core—1" SHEETROCK brand gypsum liner panels set betw USG steel 20-ga. min studs 24" o.c.—1½" THERMAFIBER SAFB—cement board screw att with 1½" DUROCK steel screws at 8" o.c. & laminated to gypsum panel with 4" strip ceramic tile mastic applied with ½" notched trowel midway betw studs—joints fin	UL Des U459	F
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	½" DUROCK cement panel—base layer ½" SHEETROCK brand gypsum panels, water-resistant, FIRECODE C core, both sides—3½" 20-ga. min. studs 16" o.c.—3" THERMAFIBER SAFB—board att with 1½" DUROCK steel screws 8" o.c.—joints taped—alt. design double-layer ½" SHEETROCK brand gypsum panels, FIRECODE C core, interior	UL Des U474	G
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Conventional Gypsum Sheathing Systems

Conventional sheathing systems with SHEETROCK brand Gypsum Sheathing are used under many exterior surfacing materials—masonry veneer, wood siding and wood shingles, stucco, brick and composition siding. Due to the high cost of many exterior surfacing products and their associated repair and/or replacement costs, U.S. Gypsum Company believes the quality of sheathing is extremely important and should not be compromised with lesser quality board sheathings that may detract from the building's exterior longevity and/or appearance.

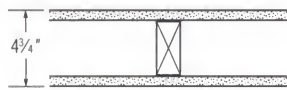
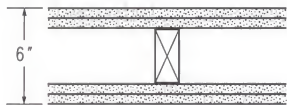
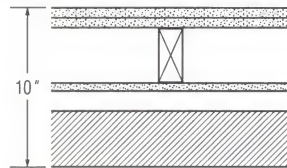
Conventional gypsum sheathing substrates include treated and non-treated core types in regular or FIRECODE Type X cores so the product which offers the most advantages for a particular job can be specified and installed.

All gypsum sheathing products meet ASTM C79. The ASTM C79 standard for gypsum sheathing requires that all gypsum sheathing products not exceed an average surface water absorption value of 1.6 grams after 2 hours of elapsed time when tested in accordance with ASTM C473. But *only* treated core gypsum sheathing has the additional requirement of an average water absorption not more than 10% by weight after 2 hours of immersion when tested according to ASTM C473.

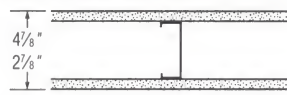
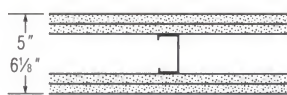
Gypsum Sheathing Limitations

- 1 Maximum stud spacing is 24" o.c.
- 2 When applied to a structure, sheathing must not be left exposed to the elements for more than one month unless the procedure as outlined in Limitation 4 is followed.
- 3 Exterior insulation and finish systems applied over gypsum sheathing mentioned here must be applied with an adhesive and mechanical system. Mechanical fasteners must go through the sheathing into the wall framing. Alternate methods of application are not endorsed by U.S. Gypsum Company. Performance of substrate are solely the responsibility of the recommending party.
- 4 To allow for extension of in-place exposure time to 6 months, all gaps resulting from cuts, corners, joints and machine end cuts of the sheathing should be filled with good grade exterior caulk at the time of erection to protect the sheathing from the elements.
- 5 For masonry and stucco curtain wall construction, it is recommended that No. 15 asphalt felt or other water barrier be applied within 30 days of sheathing erection. The felt must be properly lapped and immediately anchored by the metal lath, masonry ties, battens or other suitable means, as required for exposure conditions.
- 6 Use of sheathing for exterior ceilings and soffits is not recommended, except where covered with metal lath and stucco.


Wood Framed Exterior Walls

Fire rating	Fire-rated construction		Acoustical performance		System reference
	Detail & physical data	Description & test no.	STC	Description & test no.	
1 hr.*	 wt. 7	1/2" SHEETROCK brand Type X gypsum sheathing exterior—5/8" SHEETROCK brand gypsum panels, FIRECODE core or SHEETROCK brand gypsum panels, water-resistant, FIRECODE core, interior—2x4 16" or 24" o.c.—panels nailed 7" o.c.—1 1/2" cem ctd nails—joints exp or fin—perim caulked—UL Des U305 based on 16" stud spacing—UL Des U314 based on 24" stud spacing, joints fin	34 37 46	Based on 16" stud spacing and screws 6" o.c.— USG-30-FT-G&H Based on 24" stud spacing— USG-860807 Based on 24" stud spacing & 3" FS15— BBN 700725	A
2 hr.*	 wt. 12	2 layers 1/2" SHEETROCK Type X gypsum sheathing exterior—2 layers 5/8" SHEETROCK brand gypsum panels, FIRECODE core or SHEETROCK brand gypsum panels, water-resistant, FIRECODE core, interior—2x4 16" o.c.—base layer att with 1 1/2" nails 6" o.c.—face layer att with 2 1/2" nails 8" o.c.—joints exp or fin—UL Des U301	N/A		B
2 hr.	 wt. 12	1/2" SHEETROCK brand gypsum sheathing and 4" brick masonry veneer exterior—2 layers 5/8" SHEETROCK brand gypsum panels, FIRECODE core, interior—2x4 16" o.c.—sheathing appl horiz with 11d galv nails 6" o.c.—gypsum panels appl horiz or vert with nails 8" o.c.—joints stag & fin—UL Des U302	N/A		C

Steel Framed Curtain Walls

1 hr.*	 wt. 6	1/2" SHEETROCK brand Type X gypsum sheathing exterior—3/8" SHEETROCK brand gypsum panels, FIRECODE core, interior—3/8" studs 24" o.c.—single layer panels vert or horiz appl & screw att—joints stag & fin—perimeter caulked—UL Des U465—based on panels horiz appl—GA-WP-1200	40 49	USG-860808 Based on 3" FS15 in cavity— SA-870717	D
2 hr.*	 wt. 12	2 layers 1/2" SHEETROCK brand Type X gypsum sheathing exterior—2 layers 5/8" SHEETROCK brand gypsum panels, FIRECODE core, interior, vert appl ea side—2 1/2" or 3/8" studs 24" o.c.—base layer screw att—face layer screw att—joints stag & fin or unfin—perimeter caulked—UL Des U411	48 56	Based on 3/8" studs and 3/8" SHEETROCK brand gypsum panels, FIRECODE C core— BBN-770408 Based on 3/8" studs and 3" FS15— USG-840818	E

Steel Framed Load-Bearing Exterior Wall

1 hr.	 wt. 12	1/2" SHEETROCK brand gypsum sheathing—3/4", 20-ga. studs 24" o.c.—1" extruded polystyrene insulation installed horiz—1/2" cedar plywood exterior—3/4" THERMAFIBER FS-15 insul blks studs—1/2" SHEETROCK brand gypsum panels, FIRECODE C core, interior—load bearing up to 60% allowable stud axial load—CEG 11-9-79	N/A		F
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Note: GYP-LAP Sheathing may be used in place of SHEETROCK brand Gypsum Sheathing without affecting the above fire ratings.

*Fire rating dependent on system shown. However, exterior sheathing must be covered with surfacing material to perform as a functional exterior wall.

1 System Performance

All details, specifications, and data contained herein are intended as a general guide for using the USG Exterior Systems. Abbreviated Good Design Practices and Architectural Specifications are shown here; contact your USG representative for complete information.

These products must not be used in a design or construction of any given structure without complete and detailed evaluation by a qualified structural engineer or architect to verify suitability of a particular product for use in the structure.

Information in this publication should be used only for USG Exterior Systems, as physical properties of competitive products may vary. United States Gypsum Company assumes no liability for failure resulting from the use of alternative materials or improper application or installation of USG Exterior Systems as specified herein.

United States Gypsum Company will provide building officials and design professionals, upon written request, with test certification for published fire and structural data covering systems constructed with Company products and assembled to meet performance requirements of established test procedures specified by various agencies.

2 EIFS Substrates

If the bonding qualities of the EIFS substrate surface are suspected to be inadequate for any reason (i.e., contaminated with form release oils, loose material, peeling paints, etc.), then a mechanical system should be used in addition to adhesive.

For wavy or otherwise non-flat surfaces, first level the surface prior to adhesively or mechanically attaching the EIFS.

The EIFS substrate selected by the design professional should meet the same long-term performance requirements as the USG EIFS.

If paper-faced exterior grade gypsum sheathings are used as the substrate for adhesively attached EIFS, there is a potential for the sheathing paper to delaminate and debond from the gypsum core if the gypsum core or paper are exposed to continuous moisture. Therefore, it is recommended that installation of EIF Systems over exterior grade gypsum sheathing be applied with mechanical fasteners through the sheathing and into the wall framing. Adhesive attachment alone is not recommended and resulting system and/or sheathing performance is solely the responsibility of the specifier.

3 USG Exterior Insulation Board

Do not allow the USG Exterior Insulation Board to be left in the sun for prolonged periods of time either on the wall surface before basecoating or while in storage. If the EPS insulation board turns yellow or hardens while on the wall surface due to UV exposure, the effected EPS material should be removed by surface rasping and smoothing.

Insulation board should be fastened using adhesive whenever appropriate to maintain wall surface flatness.

4 Basecoats

The basecoat is the primary water-resisting layer within the EIFS surface lamina. It is critical that the basecoat layer be applied in strict compliance with the manufacturer's specifications. At no locations should the basecoat thickness be less than $\frac{3}{32}$ " and at no locations should the embedded reinforcing mesh be visible through the basecoat. This will generally require additional basecoat material to be applied to the wall surface after mesh embedment either by the double-back method while the first coat of basecoat is still wet, or by applying a second basecoat layer after the first coat has cured.

5 Cement Board Fasteners

Specify $1\frac{1}{4}$ " or $1\frac{1}{2}$ " DUROCK Steel Screws for 14 to 20-ga.

framing. Corrosion-resistant DUROCK Screws must be used for screw-attaching all cement board and may be used for other exterior system accessories. Specify $1\frac{1}{4}$ " or $1\frac{1}{2}$ " DUROCK Wood Screws or $1\frac{1}{2}$ " 11-ga. hot-dipped galvanized roofing nails with nominal $\frac{7}{16}$ " diameter head for attaching cement board to wood studs; $2\frac{1}{4}$ " DUROCK Wood Screws for attaching cement board over approved $\frac{1}{2}$ " rigid foam insulation, plywood or gypsum panels to wood studs. When installing trim accessories use DUROCK Screws, hot-dipped galvanized roofing nails or stainless steel divergent point staples with $\frac{1}{4}$ " long legs and $\frac{1}{2}$ " crown.

6 Structural Bracing

All steel stud framed construction must be diagonally and laterally braced as required to carry shear loads and to prevent stud rotation. Space lateral bracing a maximum of 4' o.c. Drywall can be used for lateral bracing provided it is installed prior to joint treatment and finishing of the exterior system.

7 Crack Resistance

Steel frame construction has a greater tendency to move when subjected to wind loads and temperature changes. To lessen the potential of this movement to cause cracking, direct-applied stucco finish systems should be basecoated with USG Exterior Ready-Mixed Basecoat.

8 Window and Door Openings

All window and door openings must be properly flashed, weeped and caulked. Grout exterior steel door frames with portland cement mortar.

9 Shadowing and Spotting

When the outside temperature differs considerably from the building's interior temperature, airborne dirt can accumulate on the colder regions of walls causing "shadowing" or "spotting," particularly over fasteners and framing. This is a natural phenomenon which occurs through no fault in the products.

Where temperature, humidity and soiling conditions are expected to cause objectionable blemishes, provide a thermal separation between the interior and exterior faces.

10 Expansion and Contraction Control Joints

It is the responsibility of the architect/engineer to properly design and detail the expansion joints. This includes joint locations, joint width, and selection of joint sealant material.

USG EIFS/DUROCK EIFS Applications—A control or expansion joint should be placed in an EIFS wall surface: where a control joint occurs in the supporting substrate and at a maximum joint spacing of 50' in either direction.

DUROCK Exterior Systems Applications—Surface control joint spacing for the DUROCK Exterior Finish System is 20' in either direction; for tile and thin brick finishes, max. spacing is 16' in either direction. Steel framing at building control joints that extend through the wall (with top and bottom runner tracks broken) should have $1\frac{1}{2}$ " cold-rolled channel alignment stabilizers spaced a maximum of 5'0" o.c. vertically.

Cement panel should be separated at all surface and building control joints. Where vertical and horizontal joints intersect, the vertical joint should be continuous and the horizontal joint should abut it. Splices, terminals and intersections should be caulked with a sealant complying with architectural practices and sealant manufacturer recommendations. Do not apply tile or finishes over caulked or sealed expansion joints.

11 Air and Water Infiltration

EIFS Applications—EIFS are barrier-type claddings. There is no provision for the drainage of water if the EIFS leaks for any reason. Therefore, special attention should be placed on design and proper installation of joints, openings, and penetrations. Detail the facade to keep water away from the face of the EIFS.

DUROCK Exterior Systems Applications—Flashing, weeping and sealants as shown in the details must be provided to resist air and water infiltration. DUROCK Cement Panel is not a water barrier. A water barrier must be installed over the studs with a 2" overlap or stapled to the back of the DUROCK Cement Panel before it is applied. The barrier must lap over the flashing and weep provided to allow for water drainage out of the system.

12 Vapor Retarders

Humidity and temperature conditions may require a vapor retarder. Its necessity and location should be determined by a qualified engineer to prevent moisture condensation within the wall.

13 Soffits and Ceilings

EIFS Applications—It is recommended that mechanical fasteners be used in addition to adhesive for soffits to provide additional protection against potential delamination if moisture were to accumulate on the backside of the EIFS soffit for any reason.

DUROCK Exterior Systems Applications—DUROCK Exterior Systems finished with ceramic tile, thin brick and USG Exterior Textured Finish may be used on properly vented soffits and ceilings with DUROCK Screws spaced 6" o.c. max. A qualified structural engineer should evaluate design including uplift bracing.

14 Joint Sealants

EIFS Applications—It is recommended that all joint materials be bonded to the cementitious basecoat material. It is the responsibility of the architect and sealant manufacturer to ensure that the selected sealant is compatible with what it is bonded to on both sides of the joint, i.e., the EIFS basecoat material and a window or door frame. It is recommended that windows and doors be installed after EIFS Installation to facilitate better sealing.

15 High Traffic Areas

For high traffic areas, such as first level store fronts, schools, or where lines may form, install USG Exterior Heavy-Duty Reinforcing Mesh with EIFS or consider the use of a laminated DUROCK Cement Panel System.

16 Surface-Mounted Objects

EIFS Applications—Do not attach a surface-mounted object, such as a sign, handrail, or mailbox, to the EIFS lamina. Surface mounted objects should be attached through the EIFS and directly into the building structure, i.e., stud frame or concrete block. These penetrations should then be properly sealed.

17 Leaching and Efflorescence

Latex leaching and efflorescence are natural phenomena which occur with the use of latex modified mortars and grouts through no fault in the products. To help protect against their occurrence, follow current industry guidelines and recommendations.

Note: United States Gypsum Company reserves the right to make improvements in, or change in materials and/or configurations of any products in this literature, without prior notice and without obligation to incorporate the changes or improvements in items already manufactured.

Technical Assistance and Consultation

Technical assistance and consultation are readily available from experienced technical representatives. For technical assistance on USG Exterior Products and Systems and for preparing project specifications, contact United States Gypsum Company.

Additional Information

See product folders in this series: *Gypsum Panels & Accessories* folder SA-927 for information on system components; *Plaster Systems* folder SA-920 for plaster system components; *THERMAFIBER Life-Safety Insulation Systems* folder SA-707 for data on insulation and mineral fireproofing; and *Drywall/Steel-Framed Systems* folder SA-923 for load-bearing and non-load bearing steel framing systems.

Architectural Specifications

Part 1: General

1.1 Scope—Specify to meet requirements.

1.2 Qualifications

All materials, unless otherwise indicated, shall be manufactured by or for United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Environmental Conditions

Finishes, leveling/skim coats, basecoats, insulation board and reinforcing mesh shall not be applied at temperature below 45° F or to substrate that is wet, frozen or contains frost. After application, and for at least 24 hours, finishes, leveling/skim coats and basecoats shall be effectively protected from rain, moisture and temperature below 45° F.

Hot and dry weather may affect working time of leveling/skim or basecoat and finish materials. Under rapid drying conditions, dampening of board, leveling/skim or basecoat surface may be required to improve workability.

1.5 Framing

Steel or wood framing shall be structurally sound, free from bow, and in general compliance with local building code requirements. Damaged and bowed framing shall be replaced before installation of panels.

Framing shall be designed (based on stud properties alone) not to exceed L/240 for USG EIFS, DUROCK EIFS and DUROCK Exterior Finish System; L/360 for DUROCK Exterior Systems with tile and thin brick finishes. Steel framing must be 20-ga. or heavier with a G60 hot dipped galvanized coating.

1.6 USG EIFS Description

A USG EIFS is a PB-type Exterior Insulation & Finish System comprised of a layer of insulation board covered by a lamina layer comprised of a mesh-reinforced basecoat bonded to the insulation board and finished with a protective textured synthetic stucco coating.

B The above described USG EIF System can be applied to a variety of supporting substrates including cement board, concrete, unit masonry, wood based panel sheathings, or a variety of other suitable exterior grade sheathing products.

1.7 USG EIFS Quality Assurance

A Qualifications

- 1 United States Gypsum Company shall have experience in manufacturing exterior products and systems that have a record of successful in-service performance.
- 2 Contractor shall have successfully installed several projects of a similar type, size, and geographical location as this project within the past five years. These past projects shall have resulted in construction with a record of successful in-service performance.

B Mock-Ups—Prior to installation of the system, erect mock-ups for each form of wall construction and finish required to verify selections made under sample submittals and to demonstrate esthetic effects including those related to Part 3: Execution. Build mock-ups using materials indicated for final work. Locate mock-ups on-site and build to the size indicated by the architect.



Residence, Mobile, Ala.

- C Pre-Installation Conference**—At least one (1) week prior to starting work, conduct a pre-installation conference at the project site. Parties present shall include, but not be limited to, the general contractor, contractor, architect, Owners Representative for inspection, sealant contractor, and window contractor.
- D Field Quality Control**—At frequent intervals during construction, the job site shall be visited by the Owners Representative to confirm that the USG system is being installed per this specification.

Part 2: Products

2.1 Materials Supplied by United States Gypsum Company

- A Cement Board**—DUROCK Exterior Cement Board, ½" x 48" x 8'. DUROCK Cement Board, ½" x 32" x 8', ½" x 48" x 8'.
- B SHEETROCK brand Gypsum Sheathing**—½" thick, 24" wide by 8' long with V-shaped T&G long edges, or 48" wide by (8') (9') lengths with square edges. (⅝" FIRECODE Type X also available.)
- C GYP-LAP Gypsum Sheathing**—½" thick, 24" wide by 8' long, T&G long edges, or 48" wide by 8' length with square edges. (⅝" FIRECODE Type X also available.)
- D USG Triple-Sealed Gypsum Sheathing**—⅝" thick, 48" wide by (8') (9') lengths.
- E Fasteners**—DUROCK Steel Screws, 1¼" or 1⅝" for steel framing. DUROCK Wood Screws, 1¼", 1⅝" or 2¼" for wood framing. Both types have wafer heads and anti-corrosive coatings.
- F Joint/Corner Reinforcement**—DUROCK Exterior Tape (4"x150' rolls). Polymer-coated open mesh tape for joint reinforcement of DUROCK Cement Panel joints.
- G USG Exterior Insulation Board Adhesive**—A polymer-based ready-mixed adhesive. Used for adhering USG Exterior Insulation Board to wood-based, glass mat-faced and other smooth-faced exterior grade gypsum sheathing panels.
- H USG Exterior Basecoat**—A portland cement-based ready-to-mix product containing dry latex polymers. Used for adhering USG Exterior Insulation Board to cement boards, concrete, unit masonry, and paper-faced exterior grade gypsum sheathing. Used over the USG Exterior Insulation Board and for embedding the USG Reinforcing Meshes. Available in Regular or Fiber-Reinforced for areas that require leveling.
- I USG Exterior Ready-Mixed Basecoat**—A polymer-based, noncementitious, ready-to-use product for applications when blending materials is difficult at the jobsite, when non-cementitious materials are specified, and when water- and crack-resistance are required.
- J USG Exterior Acrylic Component**—An acrylic polymer that, when combined with portland cement, adheres USG Exterior Insulation Board to substrates.
- K USG Exterior Insulation Board**—An aged Expanded Polystyrene (EPS) board per ASTM C578 meeting the following minimum requirements:
- 1 Nominal density not less than 1.0 pcf, R-Value 3.8 minimum per inch.
 - 2 Flame spread rating of less than 25 per ASTM E 84.
 - 3 Smoke developed rating of less than 450 per ASTM E 84.
- L USG Exterior Standard Reinforcing and Detail Mesh**—Light-green, open-weave, 4.5 oz/yd² glass fiber fabric treated for alkaline resistance.
- M USG Exterior Heavy-Duty Reinforcing Mesh**—Light-green, open-weave, 22 oz/yd² glass fiber fabric treated for alkaline resistance.
- N USG Exterior Textured Finish**—Ready-mixed polymer-based coating containing integral color available in fine, medium and coarse grain texture.
- O USG Exterior Stone Finish**—Acrylic polymer emulsion exterior finish providing the look of stone. Available in 5 colors.
- P ORIENTAL Exterior Stucco Finish**—Portland cement-based plaster finish compatible only with portland cement-lime base coats. Available in white or in 15 other colors (Southwest only).
- Q USG Exterior Over-Coat Finish**—Acrylic polymer emulsion coating for re-coating and touch-up of USG Exterior Textured Finish.
- R Cavity Insulation**—THERMAFIBER Mineral Fiber Insulation (specify from THERMAFIBER Life Safety Insulation Systems Folder SA-707).
- S Skim Coat and Bond Coat**—DUROCK Latex Fortified Mortar (white, gray), or mortar meeting ANSI A118.4. Ready-to-mix thin set mortar containing dry latex polymers. For skim coating, leveling, back-buttering and bonding in DUROCK ceramic tile and thin brick systems.

T Grout—DUROCK Latex Fortified Grout (designer white, natural gray), or grout meeting ANSI A118.6. Ready-to-mix grout containing dry latex polymers. For grouting ceramic tile and thin brick. Custom colors available.

U Retarder—USG Exterior Basecoat Retarder. For retarding the set of USG Exterior Basecoat in spray applications.

V Caulking—SHEETROCK Acoustical Sealant. For interior sound control applications.

W Interior Surfaces—

- 1 Gypsum Panels—(specify from *Gypsum Panels and Accessories* folder SA-927.)
- 2 Veneer Plaster—(specify from *Plaster Systems* folder SA-920).
- 3 Ceramic Tile—(specify from *DUROCK Cement Board Systems* folder SA-932).

2.2 Materials Supplied by Others

A Nails—Min. (1½") (1¼"), 11-ga., hot-dipped galvanized roofing nails with nominal ⅞" diameter head for wood framing.

B Sealant—Shall be approved by the manufacturer for use on the exterior and tested for compatibility with the substrate and USG basecoat and finish materials. Sealant should be low modulus, having a minimum joint movement capability of 50% with 100% recovery such as DOW CORNING 790 and 795 Silicone Building Sealants or equivalent. All USG EIFS materials shall be fully cured prior to sealant installation.

C Screws—1" Type S-12 Bugle Head Corrosion-Resistant Screws for application of sheathing to steel studs. 1¼" Type S-12 Pancake Head Corrosion-Resistant Screws for application of self-furring metal lath or brick ties through sheathing to steel studs.

D Insulation Board Mechanical Fasteners—WIND-LOCK Fasteners or equivalent.

E Staples—Stainless steel divergent point nom. ¼" leg, ½" crown (obtain locally).

F Epoxy Matrix and Stone Aggregate—(contact epoxy matrix supplier for suitability and application). An alternate finish system.

G Exterior Grade Ceramic Tile, Thin Brick and Thin Cut Stone Tile—(contact supplier for suitability). Adhered veneers for DUROCK Exterior System.

H Membrane—No. 15 asphalt felt or Grade D, 60 minute building paper or equivalent water and air infiltration barrier.

I Flashing—corrosion-resistant flashing for added water resistance in all DUROCK Exterior Systems.

J Trim—Architectural corners and reveals made of exterior grade vinyl or aluminum and approved for suitability by the supplier, such as FRY REGLET and Plaster Component products.

Part 3: Execution

3.1 Framing Erection

For DUROCK Systems, space wood and steel framing a maximum of 16" o.c., for USG EIFS a maximum of 24" o.c. Adequate diagonal bracing meeting design requirements must be installed prior to application of substrate. Lateral bracing of steel framed curtain walls is required prior to finishing exterior walls. Drywall or metal framing spaced a maximum of 4' o.c. is acceptable. The studs of free-standing furred walls must be secured to exterior wall with wall furring brackets or laterally braced with horizontal studs or runners spaced 4' o.c. max.

3.2 Control Joints

Control joint spacing shall be maximum 50' o.c. for EIFS, 20' o.c. for Direct-Applied DUROCK Exterior Finish System, and 16' o.c. for ceramic tile. Location and design of building control joints shall be the responsibility of the Architect/Engineer of Record.

3.3 Gypsum Sheathing Application

When installing any gypsum sheathing product, use standard gypsum board construction practices such as staggering joints and L-cutting panels around openings.

3.3.1 SHEETROCK brand Gypsum Sheathing Application

A Apply ½"x24"x8' SHEETROCK brand Gypsum Sheathing horizontally with face side out (paper on back is lapped at edges). Place tongue edge up to prevent water penetration at joints. Use diagonal bracing where necessary. Space 1¼" 11-ga. galvanized nails 8' o.c. at each stud.

B Apply ½" or ⅝"x48"x8' or 9' SHEETROCK brand Gypsum Sheathing vertically with face side out. Space nails 8" o.c. on framing members.

C For screw application, use same fastener spacing as for (A) (B).

D For application in steel-stud curtain wall construction, see specifications in SA-923.

3.3.2 GYP-LAP Gypsum Sheathing Application

Apply 2' wide GYP-LAP Gypsum Sheathing horizontally with tongue edge up, or 4' wide sheathing vertically, to braced framing. Use 11-ga. galvanized roofing nails 1¼" long, spaced 8" o.c.

3.3.3 USG Triple-Sealed Gypsum Sheathing Application

Apply 4' wide USG Triple-Sealed Gypsum Sheathing vertically to braced framing. Use 11-ga. galvanized roofing nails 1¼" long, spaced 8" o.c.

3.3.4 Corner Braces

When required install 1"x4" diagonal corner braces, or equal, at all external corners, let into face of studs, corner posts, sill and plates, or as required by applicable code. On steel framing secure steel strap bracing or equivalent as required by design or code.

3.3.5 Water Barrier

An approved water barrier should be installed over gypsum sheathing prior to exterior surfacing application in weeped and flashed systems.

3.3.6 Exterior Surfacing Application

A Wood, vinyl or aluminum siding. Drive nails through sheathing and into studs for min. penetration of 1¼" into studs. Butt end joints of siding over centers of studs.

B Wood shingles. Apply treated or decay-resistant ⅝"x1½" lath strips to gypsum sheathing. Nail lath through sheathing with 8d nails penetrating into studs. Space shingles according to their intended exposure. Nail outer course of shingles to lath with

Fence, Residence, Goose Pimple Junction, Va.



small-headed, corrosion-resistant shank nails. Project butts of outer course $\frac{1}{2}$ " below lath.

- C Masonry veneer.** Provide clear space of at least 1" between back of masonry and face of sheathing. Attach masonry ties to wood studs with nail driven through sheathing and into studs. Use nails penetrating at least $1\frac{1}{4}$ " into studs (at least 6d common nails). Anchor brick with approved brick ties, screw-attached to each steel stud using $1\frac{1}{4}$ " Type S-12 Pancake Head Corrosion-Resistant Screws. Anchor other masonry units to each stud in a similar manner, 16" o.c. max. or as recommended by Brick Institute of America.
- D Stucco.** Provide clear space of at least $\frac{1}{4}$ " between back of stucco lath and face of sheathing. Use 3.4-lb. self-furring Diamond Mesh Metal Lath Galvanized applied with nails penetrating at least $1\frac{3}{8}$ " into wood studs. Apply portland cement-lime basecoat and ORIENTAL Exterior Stucco finish coat over lathed sheathing. For curtain wall construction, attach metal lath to steel studs and runners through gypsum sheathing with $1\frac{1}{4}$ " Type S-12 Pancake Head Corrosion-Resistant Screws spaced 8" o.c.
- E Other exterior surfacing.** Apply with mechanical fasteners through sheathing into the framing. Consult exterior surfacing manufacturer for other details.

3.4 USG EIFS Application

3.4.1 Site Inspection and Preparation

Inspect the substrate to ensure that it is free of foreign materials that could compromise the bonding performance of the USG EIFS to the substrate and that it is securely fastened to the framing and is free of voids, surface delaminations, projections, or surface deterioration.

3.4.2 Exterior Insulation Board

- A** USG Exterior Insulation Board shall be applied starting at the bottom. The first course shall be supported by permanent or temporary supports. The insulation board shall be installed with the long edges horizontal using a running bond pattern. The joints shall be offset 8" minimum from the joints in the substrate. Alternate lap of USG Exterior Insulation Board at corners.
- B** Precut the USG Exterior Insulation Board into L-shaped pieces to fit around door and window openings. Joints shall not align with corners of windows, doors or other wall penetrations.

- C** Back-wrap or edge-wrap the USG Exterior Insulation Board with USG Exterior Standard Reinforcing Mesh a minimum of 2" at all terminations.
- D** Use USG Exterior Insulation Board Adhesive for adhesively attaching USG Exterior Insulation Board to wood-based, glass mat-faced and other smooth-faced exterior grade gypsum sheathing panels. Use USG Exterior Basecoat for adhesively attaching USG Exterior Insulation Board to cement boards, concrete, unit masonry, and paper-faced exterior grade gypsum sheathing panels. Additionally, when using paper-faced exterior grade gypsum sheathing, glass mat-faced sheathing or oriented strand board (OSB), mechanical fasteners shall also be used.
- E** For USG Exterior Basecoat, mix according to instructions printed on package.
- F** Apply USG Exterior Insulation Board Adhesive directly to the entire back surface only of the USG Exterior Insulation Board using a U-notched trowel having notches $\frac{3}{8}$ " deep by $\frac{3}{8}$ " wide spaced $\frac{3}{8}$ " apart. Apply USG Exterior Basecoat directly to the entire back surface only of the USG Exterior Insulation Board using a U-notched trowel having notches $\frac{1}{2}$ " deep by $\frac{3}{8}$ " wide spaced $1\frac{1}{2}$ " apart. The coated USG Exterior Insulation Board shall be immediately applied to the surface of the substrate and slid diagonally into place. The insulation board edges must butt tightly without any adhesive material between the boards. Apply firm pressure over the entire insulation board surface. Use a straightedge at least 6' long to check planeness of the adjacent USG Exterior Insulation Boards.
- G** Any gaps $\frac{1}{8}$ " or larger between USG Exterior Insulation Boards shall be filled by cutting and shaping slivers of insulation board to fit the gap and inserting them without using the basecoat adhesive.
- H** Allow the USG Exterior Insulation Board Adhesive or USG Exterior Basecoat to dry or cure for a minimum of 24 hours before sanding of insulation board or applying the reinforcing mesh and basecoat material. Protect insulation from exposure to rain, freezing conditions and physical damage until basecoat is fully dried or cured.

3.4.3 Exterior Basecoat and Reinforcing Mesh

- A** Before applying the basecoat and reinforcing mesh, all USG Exterior Insulation Board must be rasped to enhance bonding of

Residence, Washington, D.C.



basecoat, level out-of-plane edges and remove dirt and weathering damage. Do not prefill low areas with basecoat materials.

- B** Cut grooves or other design features into the insulation surface as required. The minimum thickness of the USG Exterior Insulation Board after routing shall be $\frac{3}{4}$ " at all points. Install special foam shapes to either the substrate or the surface of the USG Exterior Insulation Board as required.
- C** Inspect any previously applied areas of USG Exterior Heavy-Duty Mesh and basecoat for defects and repair prior to the application of the USG Exterior Standard Mesh and basecoat.
- D** Mix the USG Exterior Basecoat according to instructions on package.
- E** Using a stainless steel trowel, apply a uniform layer of USG Exterior Basecoat to the USG Exterior Insulation Board. Immediately embed the USG Exterior Standard Reinforcing Mesh, with its concave surface facing the wall, into the wet basecoat material and smooth with a trowel until the mesh is fully embedded. Smooth out wrinkles by working from the center to the edges. At this point, the basecoat thickness should be equal to the mesh thickness. After several minutes of mesh embedment and while the previously applied basecoat is still wet, the applicator shall double-back with a second layer of additional basecoat and smooth the surface to give a wet basecoat thickness of $1\frac{1}{2}$ times the mesh thickness or a minimum of $\frac{3}{32}$ ". The mesh shall not be visible beneath the surface of the basecoat after installation or affect the surface texture of the basecoat.
- F** USG Exterior Standard Reinforcing Mesh shall be lapped a minimum of 2" on all sides of each adjoining piece.
- G** The USG Exterior Standard Reinforcing Mesh shall be wrapped around corners from both directions for a minimum of 8."
- H** The USG Exterior Standard Reinforcing Mesh shall be back-wrapped or edge-wrapped a minimum of 2" at all terminations as required.
- I** Reinforce all wall penetrations with minimum 9" wide by 12" long pieces of USG Exterior Detail Mesh applied at a 45° angle to the corners.
- J** Allow the USG Exterior Basecoat to cure for a minimum of 24 hours before application of the USG Exterior Textured Finish.

3.4.4 Exterior Textured Finish

- A** Inspect basecoat for defects and repair prior to application of the finish.
- B** Mix the USG Exterior Textured Finish according to instructions printed on pails.
- C** Trowel-apply USG Exterior Textured Finish in a minimum $\frac{1}{8}$ " thick, uniform layer over all basecoated surfaces. Do not add sand or other additives to create heavier textures. The USG Exterior Textured Finish material is not designed to be applied thicker than $\frac{3}{16}$ ".
- D** Apply finish in a continuous operation without cold joints or scaffolding lines. A wet edge shall be maintained. Continuous work shall proceed toward joints and corners. Sufficient manpower and scaffolding shall be employed to ensure continuous application and a uniform finished appearance.
- E** Texture finish as required using only plastic or wood floats.
- F** Bring finish only a short distance into joints and returns (approximately $\frac{1}{4}$ ") such that sealant materials bond primarily to the USG Exterior Basecoat but still cover up the edge of the finish.
- G** Allow finish to dry for a minimum of 24 hours. Protect finish from weather, dust, and physical damage until fully dried.

3.5 Durock EIFS Application



Luby's Cafeteria, Memphis, Tenn.

3.5.1 Membrane—Water Barrier

- A** For steel framing, secure membrane to studs with tape or adhesive and immediately apply DUROCK Cement Panel, or staple membrane to back of DUROCK Cement Panel with $\frac{1}{2}$ " crown, $\frac{1}{4}$ " to $\frac{3}{8}$ " leg staples. Extend membrane 2" to 3" beyond board edges and lap membrane at joints in shingle-like manner to prevent water penetration into stud cavity.
- B** For wood framing, plywood or gypsum sheathing, staple membrane to framing or substrate and immediately apply DUROCK Cement Panels.

3.5.2 Cement Panel Application

- A** Apply DUROCK Cement Panel with rough side toward exterior and with ends and edges over supports. Fit ends and edges closely, but not forced together. For DUROCK Cement Panel with staple-attached membrane, apply in a shingle-like manner beginning at bottom of wall. Stagger end joints in successive courses.
- B** Fasten DUROCK Cement Panel to framing with specified fasteners. Drive fasteners in field of DUROCK Cement Panel first, working toward ends and edges. Hold DUROCK Cement Panel in firm contact with framing while driving fasteners. Space fasteners max. 8" o.c. for walls, 6" o.c. for ceilings, with perimeter fasteners at least $\frac{3}{8}$ " and less than $\frac{5}{8}$ " from ends and edges. Drive nails and screws so bottom of heads are flush with surface of DUROCK Cement Panels, to provide firm panel contact with framing. Do not overdrive fasteners.
- C** DUROCK Cement Panel should be cut to size utilizing a knife and a straight edge. A power saw should be used only if it is equipped with a dust collection device. Worker should wear NIOSH-approved dust mask.

3.5.3 USG Exterior Insulation Board

Apply USG Exterior Insulation Board to DUROCK Cement Panel as specified in Section 3.4.2.

3.5.4 USG Exterior Basecoat and Standard Reinforcing Mesh

Apply USG Exterior Basecoat and Standard Reinforcing Mesh to USG Exterior Insulation Board as specified in Section 3.4.3.

3.5.5 USG Exterior Textured Finish

Apply USG Exterior Textured Finish as specified in Section 3.4.4.

3.6 DUROCK Exterior Direct-Applied Systems Applications**3.6.1 Membrane—Water Barrier**

Apply membrane as specified in Section 3.5.1.

3.6.2 Cement Panel Application

Apply DUROCK Cement Panel as specified in Section 3.5.2.

3.6.3 Joint Reinforcement

For tile and thin brick finishes, prefill joints with DUROCK Latex Fortified Mortar. Embed DUROCK Exterior Tape centered over all joints and corners but not overlapped. For DUROCK Exterior Finish System, prefill joints with USG Exterior Basecoat and then immediately embed 4" tape and level the joints. For exposed aggregate finishes, apply DUROCK Exterior Tape and immediately apply the required thickness of coating over entire surface and embed stone aggregate.

3.6.4 Trim Accessories

When specified trim accessories are applied using DUROCK Screws, hot-dipped galvanized roofing nails, or stainless staples. Space staples 6" to 9" o.c. in each flange.

For DUROCK Exterior Finish System, treat trim accessories with USG Exterior Basecoat and level with adjacent board areas. Fill all voids and depressions with basecoat and feather mortar edges. The treated joints and trim areas must be allowed to cure for a minimum of 4 hours before application of basecoat.

3.6.5 DUROCK Direct-Applied Exterior Finish System

A Basecoat—Apply a $\frac{1}{8}$ " minimum thick, uniform layer of USG Exterior Basecoat over the entire surface after joints and trim have cured a minimum of 4 hours. Apply material by tightly scratching in an initial coat, then doubling up to the $\frac{1}{8}$ " thickness. Do not add sand or other additives. Do not apply material greater than $\frac{1}{8}$ " thick in a single application. To fill and level surface depressions caused by framing irregularities, apply USG Exterior Basecoat—Fiber-Reinforced to low areas, scratching and doubling up to a thickness of $\frac{1}{8}$ " to $\frac{1}{4}$ ". Trowel flush with adjacent areas before application of ready-mixed basecoat over entire surface. Leave surface smooth and flat. Under rapid drying conditions, dampen surface as necessary to improve workability. Allow basecoat to dry 24 hours before application of USG Exterior Textured Finish. For enhanced water- and crack-resistance, especially in steel framed applications, apply USG Exterior Ready-Mixed Basecoat according to packaging instructions in lieu of USG Exterior Basecoat.

B Finish Coat—Apply USG Exterior Textured Finish as specified in Section 3.4.4.

3.6.6 Thin Brick and Ceramic Tile Systems

Apply a $\frac{1}{8}$ " min. thick leveling/skim coat of DUROCK Latex Fortified Mortar or USG Exterior Basecoat—Fiber-Reinforced uniformly over DUROCK Cement Panel surfaces. Leave surface smooth and flat. Allow to set 24 hours before application of bond coat for setting tile and thin brick.

Ceramic tile and thin brick on walls may not exceed $\frac{3}{4}$ " thickness, 18"x18" size, and 10 psf. Install (thin brick) (ceramic tile) in accordance with ANSI 108.5 specifications and manufacturer's directions. Using the notched trowel required for the thickness of thin brick or tile being installed, apply DUROCK Latex Fortified Mortar to obtain uniform setting bed. Back-butter the (thin brick) (ceramic tile) for 100% mortar contact. Install units by firmly pressing them into freshly applied mortar. Use a sliding and twisting motion to embed units and obtain a 100% mortar contact. Beat-in ceramic tile

in accordance with accepted practice. Apply DUROCK Latex Fortified Grout after mortar has set firmly for 24 hours. Mix and apply grout according to directions on package. Force maximum amount of grout into joints. Tool and compress grout into joints to provide neat and uniform appearance. Clean grout from finished surfaces and cure installation as required by ANSI A108.10 Specification.

3.6.7 Epoxy Matrix System

DUROCK Cement Panel is a suitable substrate for many epoxy matrix stone aggregate products. Contact epoxy matrix suppliers regarding suitability of their products for this use. Mix and apply epoxy and stone aggregate material directly to the taped DUROCK Cement Panel surface according to manufacturer's directions.

3.6.8 Layered Details

To create bands, quoins, dentils and other layered details, cut DUROCK Cement Panel or insulation to specified size and shape. Laminate to basecoated DUROCK Cement Panel following same application procedure as with ceramic tile or EIFS.

3.6.9 USG Exterior Textured Finish Applied to Conventional Stucco, Concrete or Masonry

Prior to application of basecoat, new poured-in-place concrete construction should be allowed to cure for 28 days and all structural cracks and large surface voids must be filled and leveled. For new construction, the joints between the concrete masonry units should be struck flush. For existing construction the joints must be pre-filled with USG Exterior Basecoat—Fiber-Reinforced. For poured-in-place concrete, any ridges caused by form separation shall be leveled. Small surface voids (i.e., cracks, spalled areas) must be pre-filled with USG Exterior Basecoat—Fiber-Reinforced and allowed to cure for 24 hrs. prior to the actual basecoat application. Several coats may be required. Do not exceed a thickness of $\frac{1}{4}$ ". Allow basecoat to cure a minimum of 4 hours between each coat.

Apply USG Exterior Textured Finish as specified in Section 3.4.4.

Product Information and Literature: 1-800-USG-4YOU (1-800-874-4968).

Sales Offices: **Arizona:** Phoenix, (602) 866-0795 • **California:** Fremont, (510) 792-4400, Glendale, (818) 956-1882 • **Florida:** Jacksonville, (904) 764-3293, Miami, (305) 557-4501 • **Georgia:** Atlanta, (404) 393-0770 • **Hawaii:** Honolulu, (808) 591-8815 • **Illinois:** Chicago, (312) 606-5488 • **Indiana:** Indianapolis, (317) 848-1513 • **Louisiana:** New Orleans, (504) 241-2020 • **Maryland:** Baltimore, (410) 355-2200 • **Massachusetts:** Charlestown, (617) 241-8530 • **Michigan:** Southfield, (313) 569-1900 • **Minnesota:** Bloomington, (612) 854-4233 • **Missouri:** St. Louis, (314) 349-0980 • **New York:** Albany, (518) 458-7437, Stony Point, (914) 786-2820 • **North Carolina:** Charlotte, (704) 552-7402 • **Ohio:** Cleveland, (216) 899-7333 • **Oregon:** Beaverton, (503) 626-8864 • **Pennsylvania:** Philadelphia, (410) 355-2200, Pittsburgh, (800) 289-4874 • **Tennessee:** Nashville, (615) 361-8419 • **Texas:** Dallas, (214) 490-0771, Houston, (713) 868-9937 • **Utah:** Salt Lake City, (801) 266-4975 • **Virginia:** Richmond, (804) 285-7528 • **International Division:** Chicago, (312) 606-5840.

Metric Specifications: USG Corporation, through its operating subsidiaries, will provide metric conversions on its products and systems to help specifiers match metric design sizes. In addition, some products are available in metric dimensions from selected manufacturing plants. Refer to *SA-100 Construction Selector* for additional information and a Table of Metric Equivalents.

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United States Gypsum Company

125 South Franklin Street

P.O. Box 806278

Chicago, Illinois 60680-4124

A Subsidiary of USG Corporation

THERMAFIBER

**Life-Safety Fire
Containment Systems**

S A 7 0 7

USG Interiors, Inc.



USG

The
Quality Leader in

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Above:
NationsBank Plaza
Atlanta, Georgia
Architect: Kevin Roche John Dinkeloo & Associates
Owner: NationsBank and Cousins Properties Inc.

On the cover
Capital Holding Center
Louisville, Kentucky
Architect: John Burger Architects & Associates
Owner: Hines Interests Limited Partnership

The superior fire protection of THERMAFIBER insulation comes from its composition of mineral fibers with an ability to resist temperatures over 2,000°F (1,100 °C). By contrast, glass fiber insulations begin to disintegrate at about 1,050°F (565 °C).

THERMAFIBER insulations are rated "noncombustible" as defined by NFPA Standard 220. With foil facing and SMOKE SEAL compound, THERMAFIBER insulations also impede the passage of smoke.

THERMAFIBER insulations contain no asbestos. They are moisture-resistant, noncorrosive, nondeteriorating, mildew-proof and vermin-proof. If exposed to damp conditions, THERMAFIBER insulations adsorb less than one percent moisture.

The exceptional durability of THERMAFIBER insulations provides long-term retention of insulating values. Clean, positive mechanical attachment of dry units offers installation convenience and economy in any weather and at any temperature.

SMOKE SEAL compound, a fire-resistant sealant, is used in conjunction with curtain wall and/or safing insulations to make the THERMAFIBER Fire/Smoke-Stop System the most comprehensive, yet economical, system available for controlling both fire and smoke. It is conveniently applied with standard caulking guns or trowel applied from bulk pails.

Adequate protection against the spread of fire at the curtain wall requires that both curtain wall and safing insulations provide maximum protection in containing fire. The use of glass fiber insulation alone or in combination with THERMAFIBER insulation simply cannot provide the same level of protection as a total THERMAFIBER system.

THERMAFIBER curtain wall insulations protect spandrel panels and restrict the spread of fire to floors above. THERMAFIBER safing insulations fill the opening between the slab perimeter and the curtain wall insulation to inhibit the spread of fire through this opening.

Life-safety goals can only be reached by using high-melt-point products for both curtain wall insulation and safing.

High-melt-point products include mineral fiber THERMAFIBER safing insulation and curtain wall insulation but do not include glass fiber insulations. Use of low-melt-point curtain wall insulation in conjunction with safing may result in failure of the life-safety system.

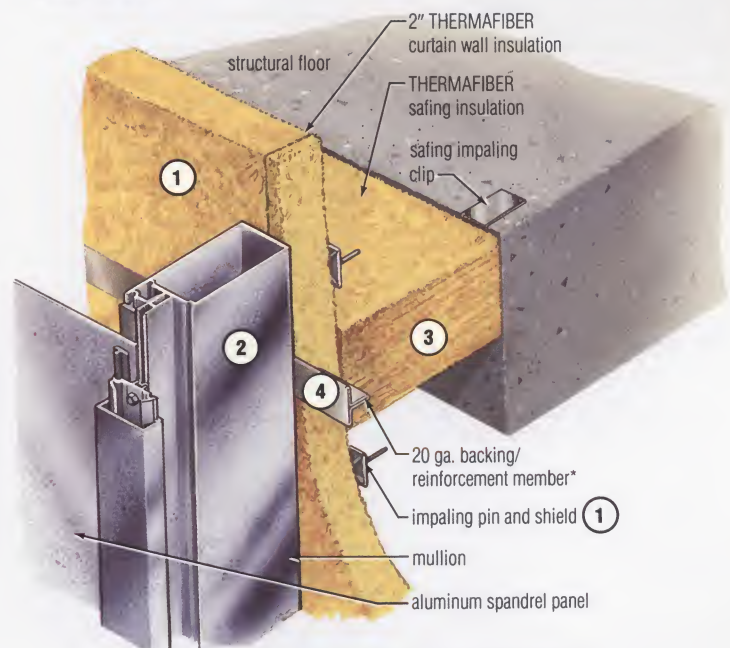
CURTAIN WALL CHECKLIST

The following checklist contains important details that must be included in a THERMAFIBER fire containment system.

1. THERMAFIBER curtain wall insulation must be attached using mechanically secured impaling pins, screws, or other positive mechanical attachment method.
2. Curtain wall insulation must protect aluminum mullions from fire.
3. Safing insulation is compression fit (min. ½" wider than opening) into safe-off area (2"-8") and supported with safing "Z" clips. When safe-off area is less than 2" wide only safing insulation may be friction fit and topped off with 1" layer of SMOKE SEAL compound in lieu of safing clips.

4. A backing/reinforcement member is placed horizontally in back of the curtain wall insulation at safing line and is mechanically attached horizontally mullion to mullion to prevent bowing of curtain wall insulation due to pressure applied from compression fit safing insulation. Typical reinforcement members include hat channels, "L" angles and "T" angles, which may be obtained from outside fabricators.

THERMAFIBER Life-Safety System Detail Used on Outdoor Fire Test (See page 4)



* may be obtained from outside fabricators

Superior Fire Containment Performance

Performance Tested A full-scale fire test was conducted to compare the effectiveness of THERMAFIBER curtain wall insulation vs. glass fiber curtain wall insulation. The side-by-side test was conducted in a two-story, outdoor testing facility at the USG Corporation Research Center in Libertyville, Illinois.

The structure was divided vertically to form two separate units. Each was faced with identical curtain walls comprised of aluminum spandrel panels and vision glass mounted to aluminum mullion framing. Only the insulation was different. Wood cribs with 7.5 lbs. of Class A combustibles for each sq. ft. of floor area were used to fuel the test. A synopsis of the test is shown below.

Close-up inspection of the curtain wall assemblies following the test indicated that when the first spandrel panel on the glass fiber unit failed, the glass fiber insulation had already disintegrated, and the wall had been breached at the floor/wall intersection and along the vertical joints of the glass fiber curtain wall insulation. (See photo, bottom left.) As a result of the disintegration of the glass fiber insulation, the safing detail was also compromised. This created openings between the structural floor and the curtain wall and provided another path for the spread of fire. No visible

deterioration or separation took place on the THERMAFIBER curtain wall or safing insulation on the THERMAFIBER insulation unit (see photo bottom right).

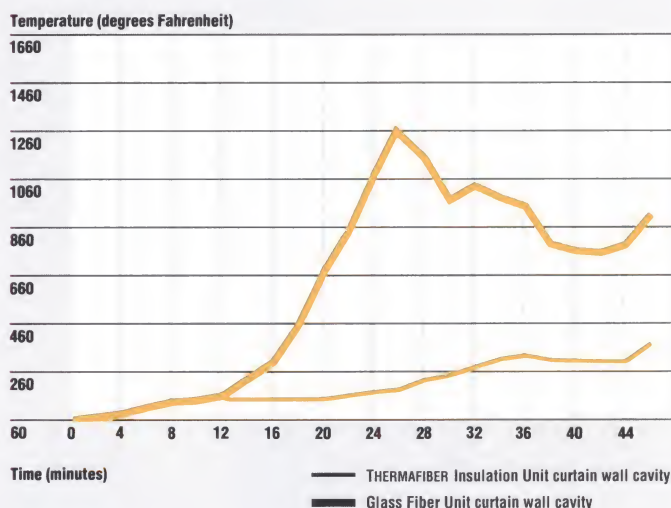
A comparison of the results showed that, on the glass fiber unit, all three aluminum spandrel panels melted while all of the spandrel panels on the THERMAFIBER insulation unit remained intact and stayed in place. On the glass fiber unit, all three of the window heads melted while none of the THERMAFIBER insulation unit window heads showed any evidence of melting. Glass fiber insulation below the second floor disintegrated and fell away while the THERMAFIBER insulation remained intact below and above the second floor level.

Analysis of the temperatures monitored by the thermocouples also provided an insight into the performance of the two insulation systems (see graph, opposite).

The data generated during this test demonstrated that fire containment can be achieved using THERMAFIBER curtain wall insulation for protection of spandrel panels and supporting structural members and THERMAFIBER safing insulation for perimeter fire-stopping. However, this containment cannot be realized using thermal insulations having low melt points, such as glass fiber.



In a comparative test, glass fiber curtain wall insulation disintegrated, dislodging spandrel panel 21 minutes into test (right). There was no visible damage to curtain wall on THERMAFIBER insulation unit (left).



Graph above shows temperatures of thermocouples placed at mid-thickness of curtain wall insulation at second floor levels of both units.

8 min. 50 sec.	First lower-floor vision glass panel shatters.
14 min.	Last lower-floor vision glass panel shatters.
15 min.	Window head melts on glass fiber unit.
20 min.	Aluminum spandrel panels melt on glass fiber unit.
21 min.	Window head on glass fiber unit falls, and middle spandrel panel is dislodged.
24 min.	Middle spandrel panel on glass fiber unit falls, showing partially disintegrated insulation above second floor.
25 min. 20 sec.	Second spandrel panel on glass fiber unit is dislodged.
31 min.	Part of third spandrel panel on glass fiber unit falls away.
46 min.	Test is terminated. No visible deterioration or separation of THERMAFIBER curtain wall insulation took place.



Inspection following test shows disintegration and horizontal breach of glass fiber insulation (left), while THERMAFIBER insulation shows no sign of damage (right).

Typical Fire Containment Designs/Tests

In February 1989, USG Interiors tested a curtain wall assembly with an unprotected granite panel to determine whether granite panels need fire protection in curtain wall assemblies. THERMAFIBER safing insulation was used to safe-off the opening between the floor slab and the granite panel. During the fire exposure, numerous cracks formed in the 3-cm (about 1-in.) thick granite panel, beginning at seven minutes into the test. The cracks went completely through the granite, demonstrating that even noncombustible materials like granite require fire protection. Previous tests have shown that THERMAFIBER curtain wall insulation provides this protection and prevents fire from penetrating the curtain wall and spreading to the floor above.

In another curtain wall test, glass spandrel panels were fire tested with glass fiber curtain wall insulation and THERMAFIBER safing insulation. Because of the glass fiber's inability to resist

high temperatures, it began to melt at ten minutes and resulted in the glass spandrel panel shattering at 21 minutes, 45 seconds. The THERMAFIBER safing insulation fell out intact (see photos on page 8). This test demonstrated that, in order to be effective, curtain wall assemblies protected with THERMAFIBER safing insulation must also contain THERMAFIBER curtain wall insulation, which can provide protection at temperatures of 2,000°F.

USG Interiors, Inc. has also conducted fire tests to measure the performance of THERMAFIBER curtain wall insulation against glass fiber and polyurethane insulations for protecting aluminum spandrel panels. Fire tested at temperatures up to 2,080°F, the THERMAFIBER insulation effectively resisted the passage of flame. It kept aluminum spandrel panel temperature well below melt point until the test was terminated more than 5 hours later. Other insulation types failed in 26 minutes or less (see table, opposite).



Typical Fire Containment System Fire test (USG 9-29-83) of typical curtain wall spandrel detail (above) demonstrates weakness in combining glass-fiber curtain wall insulation with THERMAFIBER Safing Insulation; the glass-fiber spandrel insulation melted in 10 minutes; the glass spandrel shattered in 21 minutes, 47 seconds. THERMAFIBER Safing Insulation fell out intact.

Fire-Containment Time Comparison

Insulation Type	ASTM E119 Test Time ⁽¹⁾
High-melt-point	
THERMAFIBER curtain wall insulation	5 hr. 5 min. ⁽²⁾
Low-melt-point	
Glass fiber (6-pcf density)	26 min. ⁽³⁾
Glass fiber (4-pcf density)	12 min. ⁽³⁾
Polyurethane (fire-resistant type)	2 min. ⁽³⁾

(1) Time duration of test to point at which panel is breached, allowing passage of flame and hot gases; test controlled in accordance with ASTM E119 time/temperature curve.

(2) Test of 3/4" thick aluminum curtain wall panel with insulation exposed to fire, witnessed by The Consulting Engineers Group Inc., Feb. 18, 1974. No melting or disintegration after 5 hr. 5 min. When temperature reached 2,080°F, the aluminum panel was still intact. However, to avoid furnace damage, the test was terminated.

(3) Test of 3/8" curtain wall panel with insulation exposed to fire, witnessed by Wiss, Janney, Elstner Associates, Inc., Oct. 16-20, 1972.

For additional information and details on fire containment tests, see Curtain Wall Insulation folder IW-682.

PERIMETERS

Comprehensive Protection for Complete Mid- and High-Rise Safety—Perimeters

The first priority in building safety is containment of both fire and smoke to the area of origin. For mid- and high-rise buildings, especially, this requires (1) eliminating the "flue opening" between the floor slab and spandrel panel, (2) constructing a fire containment barrier that causes the flames exiting the vision area on one floor to be diverted and cooled so that they cannot ignite combustibles on the floor above and (3) blocking smoke and flames through poke-through openings.

The USG Interiors Fire/Smoke-Stop System protects both perimeters and poke-through openings by combining THERMAFIBER safining insulation, THERMAFIBER curtain wall insulation and THERMAFIBER SMOKE SEAL compound.

How the THERMAFIBER Fire/Smoke-Stop System Works THERMAFIBER curtain wall and safining insulations have effectively stopped fire for many years. However, experience has shown smoke to be often more life-threatening than fire.

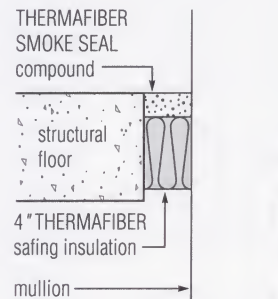
The Fire/Smoke-Stop System for perimeter protection combines foil-faced insulation with a specially designed fire and smoke resistant sealant to form an effective barrier to the passage of smoke as well as fire.

At slab perimeters, THERMAFIBER SMOKE SEAL compound is used to seal the foil backing of THERMAFIBER safining insulation to both the foil backing of THERMAFIBER curtain wall insulation and the floor slab (see photo 1). The sealed foil completely bridges the top of the opening between the slab and the curtain wall, effectively eliminating the passage of smoke through this area.

Unfaced THERMAFIBER safining insulation can also be used at slab perimeters; it is topped off with a 1/2" layer of SMOKE SEAL compound.



Photo 1 THERMAFIBER Fire/Smoke-Stop System includes foil-faced curtain wall and safining insulations plus THERMAFIBER SMOKE SEAL compound to seal all joints.



PENETRATIONS

Comprehensive Protection for Complete Mid- and High-Rise Safety—Penetrations

For poke-through openings in 4 1/2" or greater thickness floor slabs, a 2 1/2" thickness of unfaced THERMAFIBER safining insulation is friction fitted into the opening around a metal penetrant and a 2" layer of THERMAFIBER SMOKE SEAL compound is applied on top with a caulking gun or trowel to seal the opening (see photos 2 and 3).

The THERMAFIBER Fire/Smoke-Stop Systems are classified by Underwriters Laboratories, Inc., only as fire-stop systems as No. CAJ1020 (formerly UL165) and as No. WL1064.

For other floor penetrations and wall penetrations requiring a UL classification and meeting E814 parameters, see SA-727, USG Firestop System for Wall and Floor Penetrations. This catalog describes through-penetration USG Firestop Systems constructed of THERMAFIBER safining insulation and new Firecode compound for UL Systems No. WL1065, WL1063, CAJ 0032, CAJ1081, CAJ 3045, WL-1027, WL-3023, WL-7002, WL-2036, WL-3034, WL-1039, WL-2023 and WL-7001. UL also witnessed a fire test of a construction joint assembly using a USG Firestop Assembly.

THERMAFIBER safining insulation is classified as forming material for use in through-penetration firestops by Underwriters Laboratories, Inc.

**UL Listed 62L3
For Forming
Materials**



Photo 2 THERMAFIBER safining provides a fire barrier at poke-through openings.

Photo 3 THERMAFIBER SMOKE SEAL compound applied to THERMAFIBER safining insulation effectively blocks particulate, smoke and air movement. System carries UL Classification CAJ1020 for through-penetration firestops.

UL System No. CAJ1020
(formerly UL No. 165)

Ratings: F-2 hr. and 3 hr.;
T-0 hr. and ¾ hr.
(see item 3 below)

- 1. Floor or Wall Assembly**—Min. 4½" thick lightweight or normal weight concrete floor. Min. 6½" thick lightweight or normal weight concrete wall. Wall may also be constructed of any UL Classified Concrete Blocks*. See Concrete Block (CAZT) category in Fire Resistance Directory for names of manufacturers.
- 2. Steel Sleeve**—Optional, Schedule 40 (or heavier) steel sleeves.
- 3. Steel Pipe or Conduit**—Nom. 4" diam. (or smaller) electrical metallic tubing, nom. 6" diam. (or smaller) rigid steel conduit or nom. 6" diam. (or smaller) Schedule 10S (or heavier) steel pipe.

The T and F ratings of the system are dependent upon the diam. of the pipe or conduit and annular space between the pipe or conduit and the periphery of the opening as shown in the table below.

Max. Diam. of Steel Pipe or Conduit (in.)	Nom. Annular Space (in.)	T Rating (hr.)	F Rating (hr.)
1½	2½	¾	3
4	¾	0	3
6	¾	0	2

- 4. Forming Material***—Min. 2½" thick UL-labeled THERMAFIBER safing, friction fitted into the opening. USG Interiors, Inc.—Type SAFING.
- 5. Fill, Void or Cavity Material***—Min. 2" layer of SMOKE SEAL compound that is applied with a caulking gun and installed flush with the top surface. In concrete block wall assemblies, the forming material (item 4) shall be centered in the opening depth and the SMOKE SEAL compound shall be installed symmetrically. USG Interiors, Inc.—Type SMOKE SEAL Compound.

Through-penetration firestop system no. CAJ1020 is in accordance with UL Standard 1479 and ASTM E814. Tests have shown that the system performs under fire-fighting conditions including a 30 psi pressure hose stream. In the ratings for this system, the F rating is based on (1) preventing flame passage through the system and (2) resistance to the hose stream after fire exposure. The T rating is based on (1) resisting flame passage through the system, (2) preventing individual temperature rise on non-fire side of 325°F above ambient temperatures and (3) resisting the hose stream.

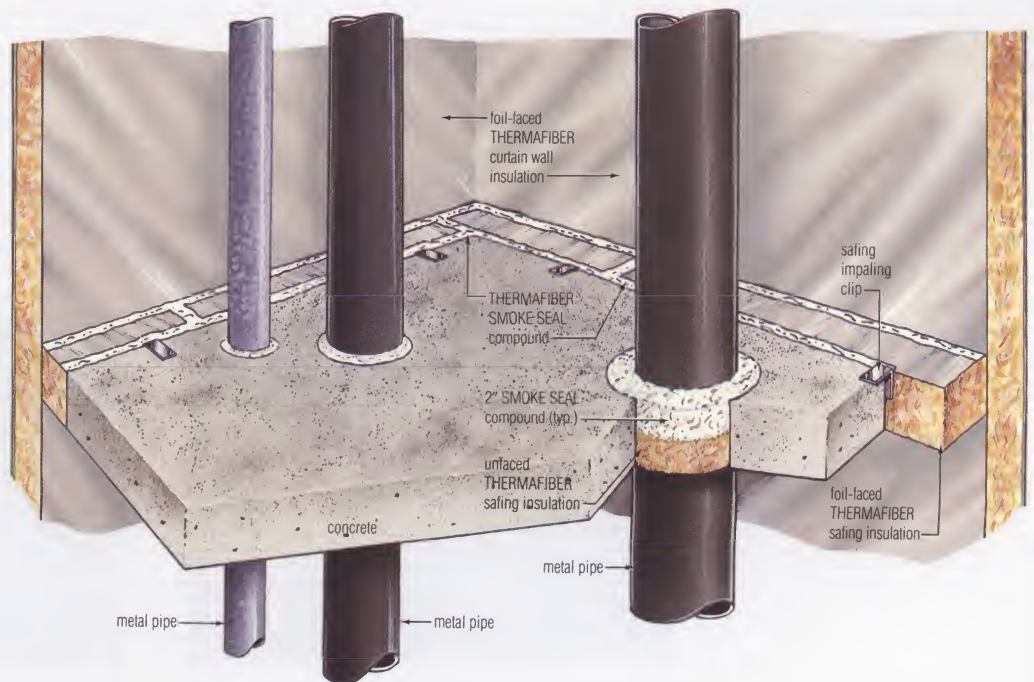
UL System No. WL1064

Ratings: F-2 hr.
T-0 hr.

- 1. Wall Assembly**—The fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
 - A. Studs**—Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom. 2" by 4" lumber spaced 16 in. o.c. Steel studs to be min. 2½" wide spaced max. 24" o.c.
 - B. Wallboard, Gypsum**—Two layers of ½" thick gypsum wallboard, as specified in the individual Wall and Partition Designs.

- 2. Pipe or Conduit**—Nom. 3½" diam. (or smaller) Schedule 10 (or heavier) steel pipe, steel conduit or electrical metal tubing (EMT) to be centered within opening. The annular space shall be min. ¾" to max. ¾". Pipe or conduit to be rigidly supported on both sides of wall assembly.
- 3. Forming Material***—Min. 2½" thickness of THERMAFIBER safing firmly packed into annular space and stud cavity in area of wall opening as a permanent form. THERMAFIBER safing to be recessed min. ½" from both surfaces of wall to accommodate the caulk fill material. USG Interiors, Inc.—Type SAF.
- 4. Fill, Void or Cavity Material***—Caulk—Min. ½" thickness of SMOKE SEAL compound applied within the annulus, flush with both surfaces of the wall. USG Interiors, Inc.—Type SS.

Thermafiber Fire/Smoke-Stop System for Perimeter and Poke Through Protection



* Bearing the UL Classification Marking

THERMAFIBER Fire/Smoke-Stop System

Smoke Chamber Test

Smoke inhalation causes 80% of all fire deaths, and 65% of fire deaths occur away from the fire room. These facts indicate that, while building assemblies perform sufficiently well to contain a fire to the room of origin, many are inadequate to contain smoke and fire gases.

One reason that building assemblies provide adequate fire containment performance is that this performance can be evaluated by a test procedure, ASTM E119. But there is no consensus test method to evaluate the ability of fire walls to contain smoke.

Building assemblies with through-penetrations can be evaluated by test procedure ASTM E814, which measures fire containment when utility services pass between units. However, no standard exists to measure the ability to contain smoke to the fire side of through-penetration assemblies.

In 1990, a new smoke containment test was developed at the USG Corporation Research Center at Libertyville, Illinois. This test evaluates the ability of through-penetration and curtain wall details to contain smoke to the fire side of an assembly.

A new airtight smoke containment test chamber was designed to measure the temperature, air volume and pressure subjected to the penetration details. The chamber was fabricated of stainless steel to form a double-layer open-topped box measuring 25"x25"x16" inside and

28"x28"x17½" outside. The space between the two skins was filled with high-temperature insulation. The box was fitted with thermocouples, an electric resistance heater, and piping and measuring devices for air delivery to the chamber. All openings in the shell were sealed with high-temperature sealant. A shelf angle was installed completely around the interior perimeter so that test specimens placed in the box would divide it into upper and lower chambers. Airtight performance of both chambers was tested and verified.

Three details were constructed to test the condition of a pipe passing through a concrete floor fitted with the THERMAFIBER Fire/Smoke-Stop System. Cured, sealed concrete slabs were cored with 2", 4" and 6" diameter holes. The pipe passing through the holes was surrounded by 2" THERMAFIBER safing measured from the base of the concrete slab. 2" SMOKE SEAL compound was applied over the safing and leveled to the top of the slab.

- Test Specimen 1—2" diam. hole passing 1" diam. pipe.
- Test Specimen 2—4" diam. hole passing 2" diam. pipe.
- Test Specimen 3—6" diam. hole passing 2" diam. pipe.

Gas Volume Rate at Maximum Fire Pressure

Test Specimen	Gas Volume Rate of Flow (Standard Cubic Feet per Minute)
<i>THERMAFIBER Fire/Smoke-Stop System</i>	
Test Specimen 1 (2" diam. hole/1" diam. pipe)	0.53
Test Specimen 2 (4" diam. hole/2" diam. pipe)	0.58
Test Specimen 3 (6" diam. hole/2" diam. pipe)	0.70
<i>Curtain Wall System</i>	
Test Specimen 4 (Foil-faced safing with SMOKE SEAL around perimeter)	0.43
Test Specimen 5 (Unfaced safing with ½" SMOKE SEAL topping)	0.80

Two details were constructed to test the condition of a curtain wall fitted with THERMAFIBER safing sealed with SMOKE SEAL compound and located a distance from the floor edge. Two cured, sealed concrete slabs were cast, each with a 16"x6" slot. A 16" length of 1" CW 90 foil-faced THERMAFIBER curtain wall insulation was secured along the long edge of the slot.

- Test Specimen 4—Slot was filled with foil-faced THERMAFIBER safing and installed foil-face up. Interfaces between the safing and the slab and curtain wall insulation foil face were both caulked with SMOKE SEAL compound.
- Test Specimen 5—Slot was filled with unfaced THERMAFIBER safing up to the top ½". Top ½" was filled with SMOKE SEAL compound.

Result: Overpressures measured in actual fire conditions range from 10 to 40 pascals (0.0015 to 0.0058 psi) above atmospheric pressure. These overpressures would tend to drive the smoke and fire gases from the fire room to adjoining rooms. Five details were tested in which the overpressures were varied. The following table shows the volume of gas passed through these fire details per unit time at an overpressure of 40 pascals, the maximum overpressure expected in an actual fire.



Smoke chamber test of curtain wall detail.



Smoke chamber test of THERMAFIBER Fire/Smoke-Stop System.

THERMAFIBER Curtain Wall FIRESpan Insulations

9

United States Gypsum Company and USG Interiors, Inc. developed fire containing exterior curtain wall systems and continue to be leaders in this field. THERMAFIBER insulation, an integral component in curtain wall systems for more than 20 years, provides fire resistance, sound isolation and thermal performance.

The exterior spandrel component is usually a panel of aluminum, porcelainized steel, structural glass, concrete, marble or granite and backed with insulation for thermal control. *To ensure spandrel integrity, the insulation backing must be a positive fire-stopping material.*

Three distinct THERMAFIBER curtain wall insulation products turn spandrel panels into fire barriers. Designed for quick mechanical attachment, these noncorrosive mineral fiber insulations function equally well in exterior column covers and in window and track fillers. Blankets are available in three densities: 4 lb./cu. ft.—CW 40; 6 lb./cu. ft.—CW 70; 8 lb./cu. ft.—CW 90.

THERMAFIBER CW FIRESpan curtain wall insulation is available as FIRESpan-40 and FIRESpan-90. See test reports on page 12.

Regular Curtain Wall or FIRESpan Insulation



Regular Curtain Wall Insulation comes as semi-rigid blankets of unfaced felt for backing spandrel panels of opaque material where no vapor retarder is needed.

FSP Curtain Wall or FIRESpan Insulation



FSP Curtain Wall Insulation is the same as regular curtain wall insulation with a tough scrim-reinforced foil facing that serves as a vapor retarder. The facing also adds durability for field installation.

Dark Curtain Wall or FIRESpan Insulation




Dark Curtain Wall Insulation is similar to regular curtain wall insulation except it has a darker color for backing dark-colored glass spandrel panels. Using dark insulation instead of light insulation improves the look of the assembly. Because the combined effects of color and shading can be unpredictable, a full-scale mock-up of the insulated spandrel is required to ensure desired appearance.

Typical Fire Containment Design/Tests

Current fire testing procedures are designed to evaluate a specific element (wall, beam or floor-ceiling). However, containing fire at an exterior wall requires fire endurance of the *entire insulating system* protecting both the spandrel and

the intersection of the floor at the spandrel. In the absence of an established fire testing procedure, USG Interiors developed a test to measure the fire containment of a complete curtain wall and safing insulation assembly.

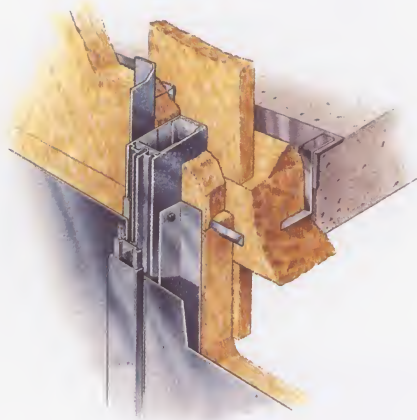
Aluminum Curtain Wall Fire Containment

- 5 hr.¹ Aluminum spandrel panel 5'x6'8", 1/8" thick, bolted to alum angle frame—2" CW-90 Curtain Wall Insulation—alum weld-on pins with speed clips approx 12" o.c.—**CEG 3-29-74**
- 2 hr. Aluminum spandrel panel 4'x6'9", 0.247" thick, bolted to frame—2" CW-40 Foil Faced Curtain Wall Insulation—8d alum-nail, weld-on pins with speed clips 14" vert, 12" horiz—**USG 10-18-71**
- 2 hr. Aluminum spandrel panel 5'x6'9", 1/8" thick, bolted to frame—2" CW-90 Curtain Wall Insulation—weld-on pins with speed clips approx. 12" o.c.—**WJE 72455**
- 1 hr.  Aluminum spandrel panel, 1/8" thick, secured to aluminum mullions at 5' o.c. with pressure plates—recessed UL-labeled 3" THERMAFIBER CW FIRESPAN 40 Insulation attached over impaling pins with sheet metal shields 12" o.c. to 2"x2" steel angles screw attached to mullions—mullions covered with 6" wide, 1" thick UL-labeled 1" THERMAFIBER CW FIRESPAN 90 Insulation impaled 12" o.c. on same pins supporting UL-labeled 3" THERMAFIBER CW FIRESPAN 40 Insulation—1"x1"x22 ga. steel angle spanning horizontally embedded in UL-labeled 3" THERMAFIBER CW FIRESPAN 40 Insulation at horizontal splice of blankets—safe-off area between furnace and assembly was sealed with 4" thick UL-labeled THERMAFIBER safing insulation with safing clips.—**UL Report Dated 1-8-93**
- 1 hr. Exterior aluminum and steel panel 4'5"x6'9" secured in frame—1 1/2" CW-90 Curtain Wall Insulation—impaling pins and speed clips near center and top—**USG 6-3-71**
1. Conducted to establish an end-point for THERMAFIBER insulation in a typical curtain wall assembly, but after 5 hr. 5 min. without failure or physical change (except color), test was terminated to avoid furnace damage.

UL Report Dated 1-8-93



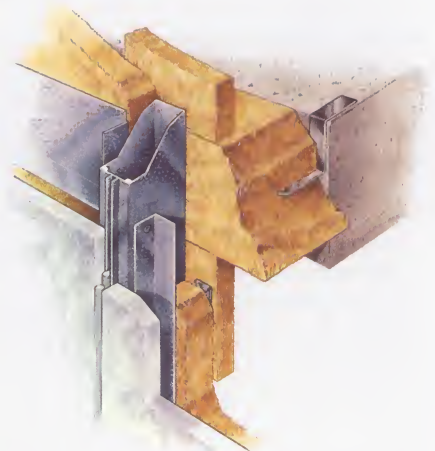
1-hour



Granite Curtain Wall Fire Containment

- 3 hr. Granite spandrel panel, 1 1/8" thick, kerfed top and bottom and inserted in alum extrusions secured to alum mullions at 5' o.c.—recessed 2" CW-90 Foil-Faced Curtain Wall Insulation screw attached with sheet metal shields at 12" o.c. to 1 1/2" x 1 1/2" 20 ga. galv steel angles screw attached to mullions—mullions covered with 6" wide, 1" thick CW-90 Foil-Faced Curtain Wall insulation screw attached 12" o.c. 2" safe off area between furnace and assembly was sealed with 4" THERMAFIBER safing compression fit and secured with safing clips modified to 1 1/2" length—**CEG 4-23-90**
- 2 hr. Granite spandrel panel, 1 1/8" thick, secured to 2 1/2"x2 1/2"x 1/4 steel angle frame 3'8"x6'6"—2" CW-90 Foil-Faced Curtain Wall Insulation—weld-on pins with speed clips spaced 12" o.c. around frame—**CEG 10-6-81**
- 2 hr. Granite spandrel panel, 1 1/8" thick, kerfed top and bottom and inserted in alum extrusions secured to alum mullions at 5' o.c.—recessed 2" CW-90 Foil-Faced Curtain Wall Insulation screw attached with sheet metal shields at 12" o.c. to 1 1/2" x 1 1/2" 20 ga. galv steel angles screw attached to mullions—mullions covered with 6" wide, 1" thick CW-90 Foil-Faced Curtain Wall insulation screw attached 12" o.c. Safe-off area between furnace and assembly was sealed with 4" Thermafiber safing secured with safing clips—**CEG 1-15-90**
- 1 hr. Granite spandrel panel, 1 1/8" thick, inserted in alum mullion frame 3'7"x6'8"—horizontal metal furring channel between mullions—2 1/2" CW-40 Curtain Wall Insulation behind channel—1/2" SHEETROCK® brand Gypsum Panels, FIRECODE C Core, applied and screw attached to channel—**CEG 7-27-81**

CEG 4-23-90; CEG 1-15-90



CEG 7-27-81



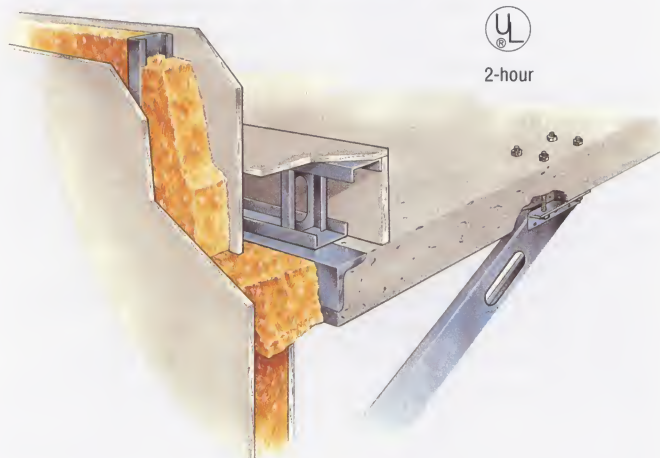
Note: Technical art and text describe the test assembly in general.

Gypsum Sheathing Curtain Wall Fire Containment

- 2 hr. Gypsum sheathing spandrel panels, $\frac{5}{8}$ " thick, secured to $3\frac{3}{4}$ " 20-ga. steel-stud framing—3" THERMAFIBER CW FIRESPAN 40 curtain wall insulation—gypsum sheathing is SHEETROCK brand FIRECODE gypsum sheathing screw-attached to exterior face of framing—concrete floor slab—4" THERMAFIBER safing insulation—steel-stud framed gypsum knee wall encloses top of the insulated safe-off gap.—**UL Classification and Design No. pending**



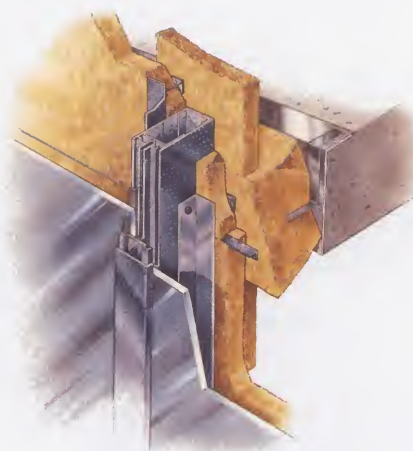
UL Classification and Design No. pending



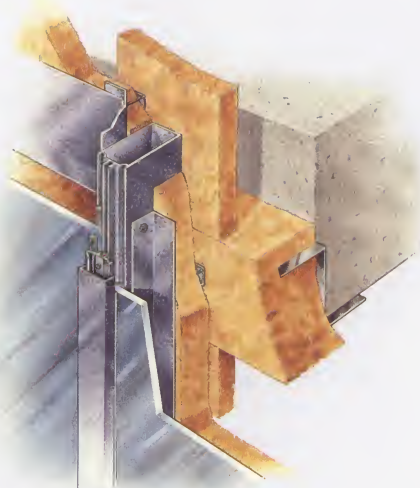
UL Report Dated 1-11-93



2-hour



CEG 12-20-89



Glass Curtain Wall Fire Containment

- 3 hr. Tempered vision-glass spandrel panel, $3'2'' \times 6'2\frac{1}{2}''$, $\frac{1}{4}''$ thick, in alum frame—2" CW-90 Dark Curtain Wall Insulation—impaled on pins secured with shields at top and bottom—**CEG 4-2-81**
- 2 hr. Heat-strengthened glass spandrel panel, $\frac{1}{4}''$ thick, secured to aluminum mullions at 5' o.c. with pressure plates—recessed UL-labeled 2" THERMAFIBER CW FIRESPAN 90 Insulation attached over impaling pins with sheet metal shields 12" o.c. to 2"x2" steel angles screw attached to mullions—mullions covered with 6" wide, 1" thick THERMAFIBER CW FIRESPAN 90 Insulation impaled 12" o.c. on same pins supporting 2" THERMAFIBER CW FIRESPAN 90 Insulation—1"x1"x22 ga. steel angle spanning horizontally embedded in 2" THERMAFIBER CW FIRESPAN 90 Insulation at horizontal splice of blankets—safe-off area between furnace and assembly was sealed with 4" thick UL-labeled THERMAFIBER safing insulation with safing clips.—**UL Report Dated 1-11-93**
- 2 hr. Tempered glass spandrel panel, $4'8'' \times 5'9''$, $\frac{1}{4}''$ thick, in alum frame—2" CW-90 Foil-Faced Curtain Wall Insulation—impaled on pins secured with shields—**WJE-72481**
- 2 hr. Tempered glass spandrel panel, $\frac{3}{8}''$ thick, secured to alum mullions at 5' o.c. with pressure plates—recessed 2" CW-90 Foil-Faced Curtain Wall Insulation screw attached with sheet metal shields 12" o.c. to $\frac{1}{4}'' \times 1\frac{1}{4}'' \times 1\frac{1}{4}''$ alum angles screw attached to mullions—mullions covered with 6" wide, 1" thick CW-90 Foil-Faced Curtain Wall insulation screw attached 12" o.c. Safe off area between furnace and assembly was sealed with 4" THERMAFIBER safing installed from underside of floor slab using safing clips mechanically attached to underside of floor slab—**CEG 12-20-89**
- 2 hr. Tempered glass spandrel panel, $\frac{3}{8}''$ thick, secured to alum mullions at 5' o.c. with pressure plates—recessed 2" CW-90 Foil-Faced Curtain Wall Insulation screw attached with sheet metal shields 12" o.c. to $\frac{1}{4}'' \times 1\frac{1}{4}'' \times 1\frac{1}{4}''$ alum angles screw attached to mullions—mullions covered with 6" wide, 1" thick CW-90 Foil-Faced Curtain Wall insulation screw attached 12" o.c. Safe-off area between furnace and assembly was sealed with 4" thick THERMAFIBER safing topped off with 1" THERMAFIBER SMOKE SEAL compound in lieu of safing clips—**CEG 1-16-90**
- 1 hr. Heat-strengthened black glass spandrel panel $3'3'' \times 5'9''$, $\frac{1}{4}''$ thick, in alum mullion frame—2" CW-90 Foil-Faced Curtain Wall Insulation inserted in mullions—support clips at floor slab—**CEG 8-6-81**
- 1 hr. Tempered solar gray glass panel $5'1\frac{1}{4}'' \times 6'10''$, $\frac{1}{4}''$ thick, set in alum mullion frame—2"x4'x5' CW-90 Curtain Wall Insulation—impaled on wire clips secured with shields 24" o.c.—**CEG 7-25-85**
1. Because safe off area was less than 2", safing insulation was friction fit and topped off with 1" of SMOKE SEAL compound in lieu of safing clips.

CEG 7-25-85



THERMAFIBER FIRESPAN UL-Witnessed Curtain Wall Tests

In multi-story buildings, THERMAFIBER CW FIRESPAN insulation prevents fire from breaking through exterior spandrel panels and spreading from floor to floor.

Fire test investigations of three THERMAFIBER curtain wall fire containment systems were conducted at the USG Corporation Research Center in Libertyville, Illinois. The tests were witnessed by Underwriters Laboratories, Inc. (UL), and the test results were reported in UL Special Services Reports dated January 8, 1993 and January 11, 1993, and a pending test report. All three assemblies were tested under positive pressure in the furnace.

The purpose of these fire test investigations was twofold. First, USG Interiors, Inc. sought to work with UL in the joint development of a test method to evaluate curtain wall fire containment systems. Because there is currently no UL or ASTM standard for testing curtain wall fire containment systems, the referenced reports are not UL-Classified or UL-listed; however, it is hoped that the test method will eventually be adopted as a UL or ASTM standard. Second, USG Interiors, Inc. sought to evaluate the relative performance of THERMAFIBER fire containment systems as utilized in typical curtain wall construction.

In actual curtain wall installations, fire can spread vertically through the safe-off area while simultaneously spreading outside of the building as a buoyant hot gas plume projecting out through the shattered vision glass and impinging on the curtain wall/vision glass assembly of the floor above. Individual evaluations of the safe-off area and the horizontal fire resistance of the spandrel panel as separate conditions are insufficient to describe the overall performance of the system as installed. Accordingly, the purpose of the test method is to evaluate the interdependent elements of a perimeter fire containment system as a whole.

The performance of the fire containment system depends

equally on protecting the curtain wall system elements that provide vertical separation and ensuring no fire spread at the safe-off region. The external exposure to flame requires that adequate vertical separation be maintained between the vision glass of a floor and that of the floor above to prevent direct ignition of the contents of the floor above.

The external exposure also causes differential heating of the curtain wall structural elements which induces thermal expansion within the system. It is our belief that this fire test method accurately simulates this exposure and demonstrates that the curtain wall fire containment system being tested can withstand and accommodate this exposure.

UL Report Dated January 11, 1993 2-Hr.-Rated, Aluminum-Framed, Glass Curtain Wall System

The assembly consisted of an aluminum-framed glass spandrel panel curtain wall protected with 2" thick THERMAFIBER CW FIRESPAN-90 curtain wall insulation, a concrete floor slab and 4" thick THERMAFIBER safing insulation (see drawing on page 11). The assembly was subjected to a standardized fire exposure test with the furnace temperature adjusted to follow the time-temperature curve specified in ANSI/UL 263, Standard for Fire Tests of Building Construction and Materials (ASTM E119, NFPA No. 2511). The assembly prevented the passage of flames and the occurrence of flaming above the concrete slab for a period of 125 minutes. The temperatures that developed during the fire exposure test for this assembly are summarized in the following table.

Location	Maximum Temperature °F	TC No.
On structural angles	1225	002
On safing materials	801	009
On unexposed surface glass face	1896	017
On mullion cover below slab	1474	025
On containment wall	1320	027

UL Report Dated January 8, 1993

1-Hr.-Rated, Aluminum-Framed, Aluminum Curtain Wall System

The assembly consisted of an aluminum-framed aluminum spandrel panel curtain wall protected with 3" thick THERMAFIBER CW FIRESPAN-40 curtain wall insulation, a concrete floor slab and 4" thick THERMAFIBER safing insulation (see drawing on page 10). The assembly was subjected to a standardized fire exposure test with the furnace temperature adjusted to follow the time-temperature curve specified in ANSI/UL 263, Standard for Fire Tests of Building Construction and Materials (ASTM E119, NFPA No. 2511). The assembly prevented the passage of flames and the occurrence of flaming above the concrete slab for a period of 62 minutes. The temperatures that developed during the fire exposure test for this assembly are summarized in the following table.

Location	Maximum Temperature °F	TC No.
On structural angles	1260	002
On safing material	1000	011
On unexposed surface glass face	1715	017
On mullion cover below slab	1598	025
On containment wall	1320	027

Note that in both of the FIRESPAN curtain wall insulation fire tests the maximum temperature on the non-fire floor occurred on the top of the safing insulation. It is important to note that, in an actual fire, a knee wall would enclose this region from the top of the slab edge up to the window sill. The knee wall is typically surfaced with gypsum wallboard. Therefore, a better representation of heat transfer through this system would be obtained by including a knee wall construction and by placing thermocouples on both the interior and exterior face of the gypsum wallboard of the knee wall.

The top of the safing material reached 801°F only after two full hours of ANSI/UL 263 (ASTM E119, NFPA No. 2511) fire

exposure. A heat flow analysis was conducted to estimate the finish temperature of a knee wall construction. The surface temperature of a ½" regular SHEETROCK® brand gypsum panel and steel stud-framed knee wall was calculated based on the safing insulation thermocouple readings and a 6" distance (diagonal) to the inside face of the wallboard. Based on the gypsum board's calcination and these calculations, it was concluded that the finish temperatures should not exceed 250°F above ambient temperatures as prescribed in the ASTM E119 standard.

UL Classification and Design No. Pending

2-Hr.-Rated, UL Gypsum Sheathing Curtain Wall Fire Containment System

The assembly consisted of a 3½" 20-gauge steel-stud-framed spandrel panel protected by 3" thick THERMAFIBER CW FIRESPAN-40 curtain wall insulation in the stud cavity, ½" SHEETROCK brand FIRECODE gypsum sheathing screw-attached to the exterior face, ½" SHEETROCK brand FIRECODE Gypsum Panels screw-attached to the interior face, a concrete floor slab, 4" thick THERMAFIBER safing insulation, and a steel-stud-framed gypsum knee wall enclosing the top of the insulated safe-off gap. The assembly prevented the passage of flames and the occurrence of flaming above the concrete slab for a period of 132 minutes. At no time during this test did the temperature on the face of the knee wall or the curtain wall above the floor slab exceed 250°F above ambient.

For detail drawings and further information on these tests, request IW-902 and IW-903 for tests dated January 11, 1993 and January 8, 1993 respectively. The test report for the gypsum sheathing curtain wall fire containment system will be available during the first quarter 1994.

THERMAFIBER Safing Insulation

THERMAFIBER safing insulation fills the void between slab edge and curtain wall insulation to contain fire. Foil-faced insulation impedes the passage of smoke and noxious gases.

THERMAFIBER safing insulation also is the principal fire-resistant material used to fill poke-through openings. (See Fire/Smoke-Stop System page 5.)

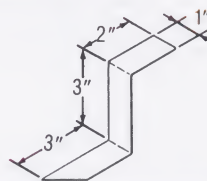
THERMAFIBER safing insulation system components include 4" thick by 24" wide blankets of insulation and specially designed safing impaling clips. Blankets are field cut and installed with safing clips or wire support brackets. Strips of insulation must be cut min. 1/2" wider than the opening to ensure a compression fit.

When safing is installed between the floor slab and curtain wall insulation which spans from mullion to mullion,

a supplementary backing/reinforcement member must be installed to prevent compression force of safing insulation from bowing curtain wall insulation.

Performance Tested In addition to extensive fire testing, THERMAFIBER safing insulation has also been tested for sound attenuation. An assembly was constructed to simulate a 6" thick concrete floor with a 6" opening between the slab and the exterior wall. The opening was filled with 4" thick, 4-lb./cu. ft. density THERMAFIBER safing insulation covered top and bottom with steel plates. This assembly produced a rating of STC 49, outperforming an assembly where the opening was filled with 2-lb./sq. ft. lead. Filling the space with concrete produced an assembly rating of STC 54.

THERMAFIBER Safing Impaling Clip



THERMAFIBER safing insulation is the preferred forming material for UL Designs U900D, U900J, U900K, U900X, and U900Y.



THERMAFIBER safing insulation is cut wider than the opening to ensure compression fit. Installs easily with wire support brackets or safing clips. Available with foil backing to impede smoke and noxious gases.

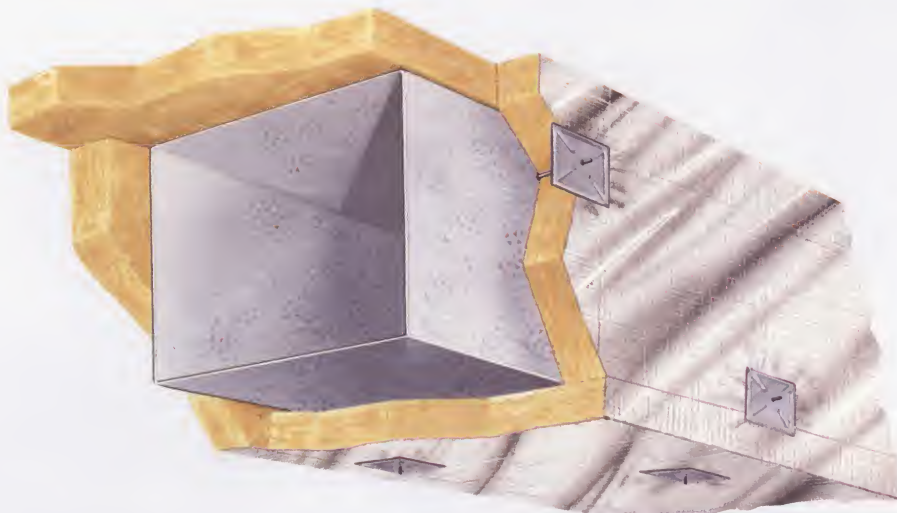
Safing Insulation Fire Containment

3 hr. Spandrel panel containing CW insulation and forming one end of the furnace—safe-off area sealed with 8"x4" THERMAFIBER safing strip—
WJE-71460 Dated 11-30-71

THERMAFIBER Mineral Fiber Fireproofing for Kitchen Ducts

THERMAFIBER kitchen duct fireproofing protects buildings against fires that occur in kitchen grease ducts. The semi-rigid batt comes 2 1/2" thick, 8-lb./cu. ft. density, and is faced with aluminum foil. The THERMAFIBER kitchen duct fireproofing is applied around the 16-ga. steel duct, impaled on mechanically attached pins and secured with sheet metal shields. Tested in accordance with Section 64.67(6) of the State of Wisconsin Code (CEG Report 9-12-77), assembly provides a 2-hr. rating.

This product is also UL-Labeled per ASTM E84 for its surface burning characteristics.



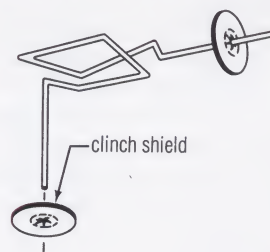
THERMAFIBER Mineral Fiber Structural Fireproofing

Fire can weaken structural steel framing in high-rise buildings. THERMAFIBER mineral structural fireproofing is a semi-rigid, asbestos-free felt that is noncorrosive to steel and aluminum and insulates structural framing from the heat of fire. Ease of installation and minimal clean-up make it far superior to spray-on fireproofing materials.

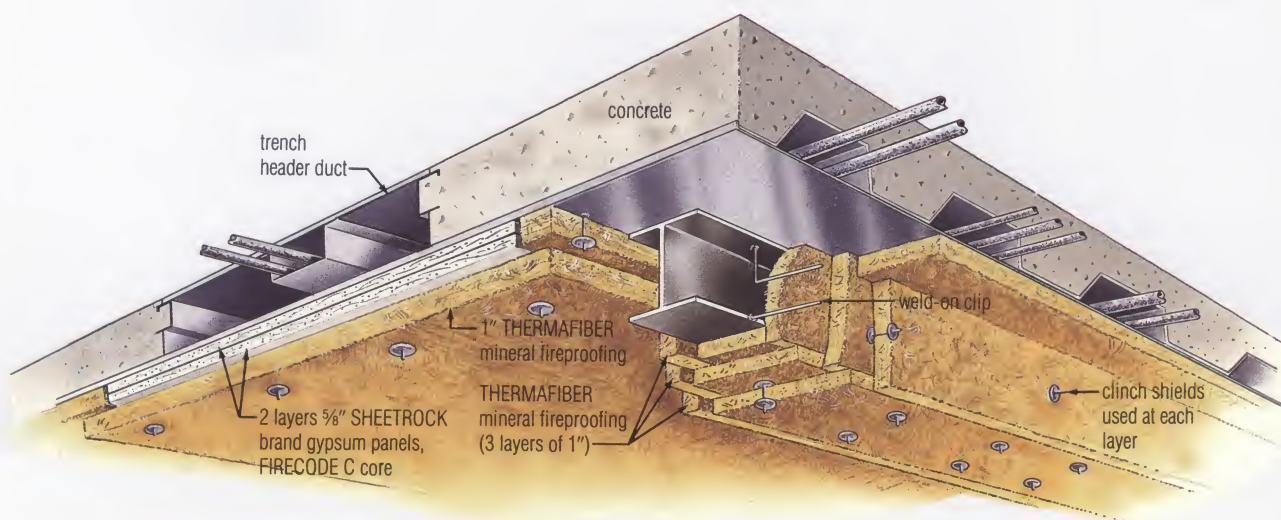
Eight UL designs are available with fire ratings as follows: 4-hr.—No. X304; 3-hr.—Nos. X306, N304, D301; 2-hr.—Nos. X305, N305, N304, D915, D302.

To estimate protection required for different size steel structural members, consult American Iron and Steel Institute (AISI) brochure "Designing Fire Protection for Steel Columns." AISI is headquartered in Washington, D.C.

12-ga. Snap-on Flange Clip
(available from Wabash, IN)



12-ga. weld-on clips and 10-ga. cap-type stud welding pins are available from outside vendors.



Fire Ratings & UL Designs

Fire Rating	Description	UL Design No. **	Column or Beam Size
4 hr.	Mineral Fireproofing—single-layer 2" thick batts around column impaled on 1/8" steel wire studs welded to column, clip-on stud or strap-attached barbed battens.	X304	W14 x228
3 hr.	Mineral Fireproofing—double-layer 2" thick batts around column impaled on 1/8" steel wire studs welded to column, clip-on stud or strap-attached barbed battens.	X306	W10 x49
3 hr.†	Mineral Fireproofing—double-layer 2" thick around beam attached with stud welding pins or 12-ga. flange clips and clinch shields spaced 12" o.c. max.—2 1/2" concrete on fluted steel floor units—additional pieces of mineral fireproofing stuffed between crests of fluted deck and beam.	N304	W8 x24
3 hr.††	Mineral Fireproofing—single-layer 1 1/2" thick under floor deck and trench header with double-layer 5/8" SHEETROCK brand Gypsum Panels, FIRECODE C Core, under trench header—triple-layer 1 1/2" thick mineral fireproofing around beam—fireproofing and panels attached with stud welding pins and clinch shields—2 1/2" concrete on fluted steel floor units.	D301	W6 x12
2 hr.	Mineral Fireproofing—single-layer 2 1/2" thick batts around column impaled on 1/8" steel wire studs welded to column, clip-on stud or strap-attached barbed battens.	X305	W10 x49
2 hr.	Mineral Fireproofing—double-layer 2" thick around beam attached with stud welding pins or 12-ga. flange clips and clinch shields spaced 16" o.c. max.—3 1/4" concrete on fluted steel floor units.†	D915	W8 x13
2 hr.	Mineral Fireproofing—single-layer 2" thick around beam attached with stud welding pins or 12-ga. flange clips and clinch shields spaced 12" o.c. max.—2 1/2" concrete on fluted steel floor units—additional pieces of mineral fireproofing stuffed between crests of fluted deck and beam.	N305	W8 x24
2 hr.†††	Mineral Fireproofing—single-layer 1" thick under floor deck and trench header with double-layer 5/8" SHEETROCK brand Gypsum Panels, FIRECODE C Core, under trench header—triple-layer 1" thick mineral fireproofing around beam—fireproofing and panels attached with stud welding pins and clinch shields—2 1/2" concrete on fluted steel floor units.	D302	W6 x12
1 1/2 hr.	Mineral Fireproofing—single-layer 2" thick around beam attached with stud welding pins or 12-ga. flange clips and clinch shields spaced 12" o.c. max.—2 1/2" concrete on fluted steel floor units.	N304	W8 x24

† Restrained beam rating; unrestrained beam rating is 2 hr. †† Beam rating 4 hr. ††† Beam rating 3 hr. ** Design prefix designates columns (X), Beams (N), Floors (D)

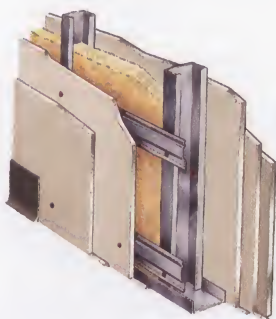
Sound Attenuation Fire

Blankets THERMAFIBER sound attenuation fire blankets (SAFB) are effective barriers to sound transmission for improved privacy and productivity in the workplace. They are particularly useful in partitions requiring fire ratings and as overlayment for ceilings to improve acoustics.

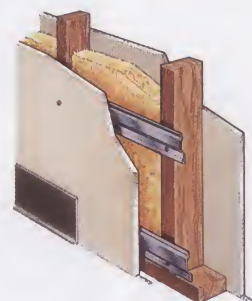
Depending on the particular assembly and application, partition STC ratings have been improved up to nine points by installing THERMAFIBER SAFB in the stud cavity. The insulation also has been shown to improve MTC ratings for low-frequency sound attenuation, isolating sounds from machinery, mechanical equipment and music.

THERMAFIBER SAFB are superior to glass fiber in sound attenuation. In fact, low-density glass fiber insulation must be nearly twice as thick as standard THERMAFIBER SAFB to provide the same attenuation.

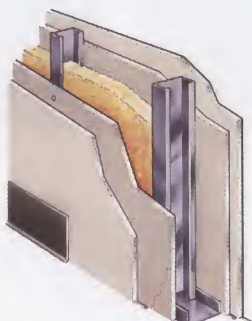
THERMAFIBER 3" SAFB with 2 layers resilient attached drywall one side, 3 layers direct attached drywall other side.
Sound test TL-87-153: 61 STC, 56 MTC.
UL Design U-455: 3-hour rating.



THERMAFIBER 3" SAFB with 1 layer resilient attached drywall one side, 1 layer direct attached drywall other side.
Sound test BBN-760903: 50 STC.
UL Design U-311: 1-hour rating.



THERMAFIBER 1 1/2" SAFB with 2 layers direct attached drywall both sides.
Sound test SA-800421: 55 STC.
UL Design U-412: 1-hour rating.



THERMAFIBER 3" SAFB with 2 layers resilient attached drywall on ceiling side, gypsum Type F pumped flooring, carpet and pad on floor side.
Sound test TL-90-40: 59 STC, 54 MTC.
UL Design I-541: 2-hour rating.



Creased THERMAFIBER SAFB

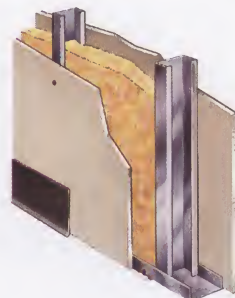
Creased THERMAFIBER SAFB offer the most economical drywall sound systems in the 50 to 55 STC range. These fire-rated systems are ideal for party and corridor walls in hotels, motels, offices, and multi-family dwellings.

The creased THERMAFIBER SAFB system is a patented insulation blanket assembly that is 1" wider than regular blankets. After the blanket is installed in the partition cavity, a 1" vertical slit is field-cut partially through the center of the blanket, allowing it to be creased. Compressing the extra width into the stud cavity buckles the center, exerting pressure against both studs and drywall. This pressure dampens sound vibrations and boosts the partition's STC rating.

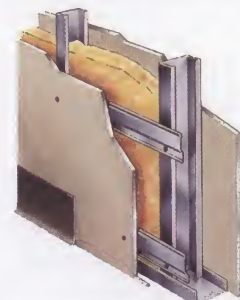
For example, a single-layer drywall partition with Creased THERMAFIBER SAFB has the same STC rating as an unbalanced drywall partition with standard SAFB.

For further information about THERMAFIBER SAFB and Creased SAFB, request IW-885, SAFB System Performance. For information about plaster and drywall partition systems construction for sound control, consult United States Gypsum Company publications SA-919 and SA-920 in Sections 09250 and 09200 respectively of Sweet's General Building and Renovation File.

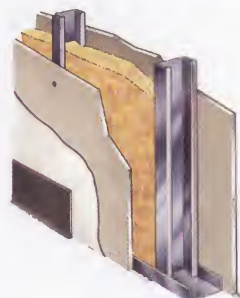
THERMAFIBER 3" Creased SAFB with 1 layer direct attached drywall on each side.
Sound test TL-85-128: 51 STC.
UL Design U-465: 1-hour rating.



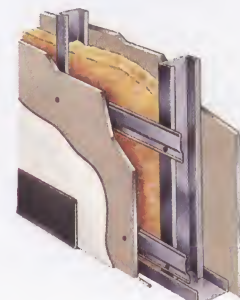
THERMAFIBER 3" Creased SAFB with 1 layer resilient attached drywall one side, 1 layer direct attached drywall other side.
Sound test SA-850415: 55 STC.
UL Design U-451: 1-hour rating.



THERMAFIBER 3" Creased SAFB with 1 layer direct attached gypsum base and veneer finish both sides.
Sound test SA-860620: 50 STC.
UL Design U-465: 1-hour rating.



THERMAFIBER 3" Creased SAFB with 1 layer resilient attached gypsum base and veneer finish one side, 1 layer direct attached gypsum base and veneer finish other side.
Sound test SA-860635: 55 STC.
UL Design U-451: 1-hour rating.



FS-15 and FS-25 Blankets

- **THERMAFIBER FS-15 Commercial Blankets**, when installed in exterior walls, reduce heat transmission, saving energy and improving occupant comfort. They are ideal for commercial wood- and steel-stud assemblies and exterior Z-furring. Flame spread rating is 15, smoke developed 0.
- **THERMAFIBER FS-25 Commercial Blankets** provide thermal and sound control properties and are also foil-faced with an FSP vapor retarder. They are intended for most exposed-insulation and vapor-control situations such as floor/ceilings, walls or crawl spaces. Flame spread rating is 25, smoke developed 5.



Product Data and Insulating Value Information

Sizes & Shipping Points

Product Designation	Birmingham, AL				Wabash, IN				Tacoma, WA			
	Min. Thick.	Max. Thick.	Standard Sizes		Min. Thick.	Max. Thick.	Standard Sizes		Min. Thick.	Max. Thick.	Standard Sizes	
			Width ⁽²⁾	Length ⁽²⁾			Width ⁽²⁾	Length ⁽²⁾			Width	Length
CW 40 ⁽¹⁾	2"	6"	24"	36" 48" 60"	2"	6"	24"	36" 48" 60"	2"	4"	24"	48"
CW 70 ⁽¹⁾	1½"	5"	24"	36" 48" 60"	1½"	6"	24"	36" 48" 60"	1½"	2½"	24"	48"
CW 90 ⁽¹⁾	1"	4"	24"	36" 48" 60"	1"	5"	24"	36" 48" 60"	1"	2"	24"	48"
THERMAFIBER CW FIRESPAN 40	3"	6"	24"	36" 48" 60"	3"	6"	24"	36" 48" 60"	—	—	—	—
90	2"	4"	24"	36" 48" 60"	2"	5"	24"	36" 48" 60"	—	—	—	—
Safing ⁽¹⁾	4"	4"	24"	48"	4"	4"	24"	48" & 60"	4"	4"	24"	48"
SMOKE SEAL Compound	30 oz. cartridge, 5 gal. pails				30 oz. cartridge, 5 gal. pails				30 oz. cartridge, 5 gal. pails			
Mineral Fireproofing	1"	4"	24"	48"	1"	4"	24"	48" & 60"	—	—	—	—
Kitchen Duct Fireproofing	2½"	2½"	24"	48"	2½"	2½"	24"	48"	—	—	—	—
SAFB	1"	3"	16", 24"	48"	1"	3"	16", 24"	48"	1"	3"	16", 24"	48"
FS-15	1"	6"	16", 24"	48"	1"	6"	16", 24"	48"	1"	6"	16", 24"	48"
FS-25	3"	6"	16", 24"	48"	3"	6"	16", 24"	48"	3"	6"	16", 24"	48"

NOTE: Dimension tolerances—width ±¼", length -¼" +¼", thickness -¼" +¼" (Tacoma products -½" +½").

(1) Aluminum-foil facing, available from all plants; also dark curtain wall insulation, available from Wabash or Birmingham plants.

(2) Consult sales representative for additional sizes. SAFB density 1" = 4 lb., all others = 2.5 lb.

Thermal Resistance Values* (R = I/C) For use in calculating heat transmission coefficients (u)

Insulation Values

Blanket Thickness	SAFB	Product & R Value	
		FS-25 (Foil Faced)	FS-15 (Unfaced)
6"	22	22	22
5 1/2"	19	19	19
3 1/2"	13	13	13
3"	11	11	11
2"	7.41	N/A	7.41
1 1/2"	5.6	N/A	5.6
1"	4	N/A	4

*Based on listings in ASHRAE Handbook of Fundamentals (1985).

Material Values

3/8" insulating sheathing	2.06	asphalt shingle roofing	0.44
1/2" insulating sheathing	1.32	1/2" gypsum panels	0.45
3/8" gypsum sheathing	0.45	3/8" plaster base	0.32
1" extruded polystyrene insulation ⁽¹⁾	5.00	1/2" sanded plaster	0.09
1/2" plywood	0.62	1/2" plaster with light wt. aggregate	0.32
3/4" plywood	0.93	portland cement with aggregate (per in.)	0.20
1/4" hardboard	0.34	4" common brick	0.80
3/4" softwood (pine)	0.94	4" face brick	0.44
3/4" hardwood	0.68	8" clay tile	1.85
1" x 8" wood drop siding	0.79	8" concrete block with sand aggregate	1.11
3/4" x 10" beveled wood siding	1.05	vapor-permeable felt	0.06
exterior stucco (1" thick)	0.20	vapor retarder plastic film	negl.
3/8" built-up roofing	0.33	carpet and fiber pad	2.08
wood shingle roofing	0.94	floor tile—asphalt, vinyl	0.05

(1) Thermal resistance for extruded polystyrene insulation at 40°F mean temperature is 5.4; data based on certified test.

Thermal Conductivity (according to ASTM C518)

Product Designation	"k" @75°F. btu · in./ hr. · sq. ft. °F.	For insulation only																	
		1" thick		1½" thick		2" thick		2½" thick		3" thick		3½" thick		4" thick		5½" thick		6" thick	
		R ⁽²⁾	U ⁽³⁾	R	U	R	U	R	U	R	U	R	U	R	U	R	U	R	U
CW 40	0.25 ⁽¹⁾	—	—	—	—	8.0	0.13	10.0	.1	12.0	.083	14.0	.071	16.0	.062	—	—	24.0	.042
CW 70	0.24 ⁽¹⁾	—	—	6.2	0.16	8.3	0.12	10.4	.095	12.5	.080	14.6	.068	16.6	.060	—	—	25.0	.040
CW 90	0.23 ⁽¹⁾	4.3	0.23	6.5	0.15	8.7	0.11	10.9	.091	13.0	.076	15.2	.066	17.4	.057	—	—	—	—
CW FIRESPAN 40	0.25	—	—	—	—	—	—	—	—	12.0	.083	—	—	16.0	.062	—	—	—	—
CW FIRESPAN 90	0.24	—	—	—	—	8.7	.011	—	—	13.0	.076	—	—	17.4	.057	—	—	—	—
Safing	0.25	—	—	—	—	—	—	—	—	—	—	—	—	16.0	—	—	—	—	—
Mineral Fireproofing	0.23	4.3	—	6.5	—	8.7	—	10.9	—	—	—	—	—	—	—	—	—	—	—
1" SAFB	0.25	4.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
All other SAFB	0.27	—	—	5.6	—	7.4	—	9.3	—	11.1	—	13.0	—	14.8	—	19.4	—	22.2	—
1" FS-15	0.25	4.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
All other FS-15	0.27	—	—	5.6	—	7.4	—	9.3	—	11.1	—	13.0	—	14.8	—	19.4	—	22.2	—
FS-25	0.27	—	—	—	—	—	—	—	—	11.1	—	13.0	—	14.8	—	19.4	—	22.2	—

(1) Applies to both standard color and dark curtain wall insulation.

(2) R = thickness ÷ K.

(3) U value shown is for insulation only. However, in practice U values represent the overall heat transmission of all components in an assembly ($U = 1 \div \text{Total R}$).

Surface Burning Characteristics (According to ASTM E84)

Product Designation	Flame Spread	Smoke Developed
CW Regular (Unfaced) ⁽¹⁾	15	0
CW Foil-Faced ⁽¹⁾	25	0
CW FIRESPAN (Unfaced)	15	0
CW FIRESPAN (Foil-Faced)	25	0
Safing Regular (Unfaced)	15	0
Safing Foil-Faced	25	0
Mineral Fireproofing (Unfaced)	15	0
Mineral Fireproofing Foil-Faced	25	0
Kitchen Duct Fireproofing Foil-Faced	25	0
FS-15 Blankets	15	0
FS-25 Blankets	25	0
SAFB	15	0
SMOKE SEAL Compound	5	0

All products have a class A interior finish rating per NFPA 101, life safety code.

(1) Applies to both standard color and dark curtain wall insulation.

Air Space Values*

	Type of Surface	
	Non-Reflective	Reflective
Heat flow up		
1/2" space	0.75	1.57
3/4" space	0.77	1.66
3 1/2" space	0.84	2.01
Heat flow down		
1/2" space	0.91	2.54
3/4" space	1.02	3.52
3 1/2" space	1.22	8.17
Heat flow horizontal		
1/2" space	0.90	2.46
3/4" space	0.94	2.77
3 1/2" space	0.91	2.55

*Based on 50° F mean temperature and 30° F temperature differential.

Air Surface Values

	Type of Surface	
	Non-Reflective	Reflective
Inside, heat flow up (still air)	0.61	1.32
Inside, heat flow down (still air)	0.92	4.55
Inside, heat flow horizontal (still air)	0.68	1.70
Outside, (15 mph wind)	0.17	—
Outside, (7.5 mph wind)	0.25	—

Fire Resistance Rated noncombustible as defined by NFPA Standard 220 when tested according to ASTM E136.

Product Density

Product Designation	Nom. Density —pcf	Approximate Density Tolerance—pcf ⁽²⁾			Application Method
		Tacoma	Birmingham Wabash	Min. Thick.	
CW 40 ⁽¹⁾	4.0	±0.5	-0.5 +1.0	2"	see tests for req'd. attachment
CW 70 ⁽¹⁾	6.0	±0.75	-0.75 +2.0	1 1/2"	
CW 90 ⁽¹⁾	8.0	±1.0	-1.0 +2.0	1"	
Safing	4.0	±0.5	-0.5 +1.0	4"	brackets or safing clips
Mineral Fireproofing	9.0	±1.5	-1.5 +2.0	2", 2 1/2"	snap-on wire clips or weld-on studs
1" SAFB	4.0	±0.5	-0.5 +1.0	1"	friction fit between studs
All other SAFB	2.5	±0.5	-0.5 +1.0	1 1/2"	friction fit between studs
1" FS-15	4.0	±0.5	-0.5 +1.0	1"	friction fit between studs
All other FS-15	2.5	±0.5	-0.5 +1.0	1 1/2"	friction fit between studs
FS-25	3.0	±0.5	-0.5 +1.0	3"	friction fit between studs

(1) Applies to both standard color and dark curtain wall insulation.

(2) On package weight basis.

Specification Compliance

Products meet:

ASTM C665

Federal Specification HH-I-521F—

- Curtain Wall Insulation as Types I and III (.02 perm, tested in accordance with ASTM E96 procedure)
- Safing Insulation as Type I
- Mineral Fireproofing as Type I
- SAFB Blankets as Type I
- FS-15 Blankets as Type I
- FS-25 Blankets as Type III, Class A

ASTM C612

Federal Specification HH-I-558B—

- Curtain Wall Insulation (all) as Classes 1 and 2 (.02 perm, tested in accordance with ASTM E96 procedure)
- Curtain Wall Insulation (CW 70, CW 90) as Classes 3 and 4 (.02 perm, tested in accordance with ASTM E96 procedure)
- Safing Insulation as Classes 1 and 2
- Mineral Fireproofing as Classes 1, 2, 3 and 4

ASTM E814

UL Standard 1479

- Safing Insulation used in conjunction with SMOKE SEAL Compound

ASTM C553

- THERMAFIBER Insulations adsorb less than 1% moisture by weight and volume

Products are approved by:

New York City Board of Standards & Appeals

- Curtain Wall Insulation, .02 perm, tested in accordance with ASTM E96 procedure (under BSA 214-73-SM & accepted by MEA-209-82)
- FIRESpan Curtain Wall Insulation, MEA 189-93-M, MEA 190-93-M

- Safing Insulation (619-48-SM & 39-74-SM)
 - Mineral Fireproofing (under BSA 619-48-SM & accepted by MEA: 70-71-M [4-hr. col.], 28-75-M [3-hr. col.], 25-74-M [2-hr. col.], 24-74-M & 138-75-M [beams])
- State of Wisconsin Code
- Kitchen Duct Fireproofing (Section 64.67[6])

Good Design Practices

- 1 **Vapor Retarders**—In air conditioned buildings in localities where high humidity and temperatures predominate, consideration should be given to placing the vapor retarder on warm or outside of wall to prevent moisture condensation within the insulation.
- 2 **Ceilings**—Insulation should be carefully fitted around—not over—recessed light fixtures. Covering fixtures with insulation causes heat to build up, which could possibly result in fire.
- 3 **Glass Spandrels**—To prevent possible moisture or condensation problems, minimum 1" air space is required between glass spandrels and insulation behind them.

- 4 **Exterior Walls**—Penetrations in exterior walls for windows, doors, outlets, HVAC, etc., must be sealed with sealant or tape. Foil tape also should be used in foil-faced curtain wall applications to close joints and repair damaged areas. Mechanical attachment of safing and curtain wall insulation is required to avoid dislodging because of air movement, particularly in furred exterior walls without sheathing or backing.

- 5 **Test Data**—USG Interiors, Inc. will provide certified test data for published fire, sound and structural systems designed and constructed according to its published specifications. Tests are conducted on curtain wall assemblies fire-protected with these products to meet performance requirements specified by various agencies. *System performance following any substitution of materials or compromise in assembly design cannot be certified and may result in failure under critical conditions.*

Part 1: General

1.1 Scope—Specify to meet project requirements.

1.2 Qualifications

All materials, unless otherwise indicated, shall be supplied by USG Interiors, Inc. or United States Gypsum Company (THERMAFIBER sound attenuation fire blankets) and shall be installed according to current printed directions.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Design Conditions

THERMAFIBER (curtain wall) (safety) (Fire/Smoke-Stop System) (mineral fireproofing) (sound attenuation fire blanket) (FS-15) (FS-25) Insulation shall be (1) (2) (3) (4) (5)-hr. fire-tested under simulated field conditions using ASTM E119 guidelines.

Part 2: Products

2.1 Life-Safety Insulation

2.1.1 Curtain Wall

THERMAFIBER mineral fiber curtain wall insulation, (CW-40)(CW-70)(CW-90), () thick, () wide, () long, type ([regular] [dark] color, unfaced, non-vapor retarding) (FSP, scrim-poly reinforced foil-facing vapor retarder). THERMAFIBER CW FIRESPAN (40) (90), () thick, () wide, () long, UL-labeled.

2.1.2 Safing

THERMAFIBER mineral fiber safing insulation, regular color, (unfaced) (vapor retarding foil-faced) with galvanized steel safing clips, UL-labeled.

2.1.3 Sealing Compound

THERMAFIBER SMOKE SEAL compound, smoke-resistant, in (30-oz. cartridges) (5-gal. pails).

2.2 Fireproofing Insulation

2.2.1 Structural

THERMAFIBER mineral fiber fireproofing, 9-lb./ft.³ density, (unfaced) (foil-faced), (1) (2) (2 1/2) inches thick, 24" wide by (48) (60) inches long.

2.2.2 Kitchen Duct

THERMAFIBER mineral fiber fireproofing, 8-lb./ft.³ density, (foil-faced), 2 1/2" thick, 24" wide by 48" long.

2.3 Sound Insulation

THERMAFIBER sound attenuation fire blankets, (1) (1 1/2) (2) (2 1/2) (3) inches thick, (16) (24) (25) inches wide, 48" long, unfaced.

2.4 Thermal Insulation

THERMAFIBER commercial blankets, (1) (1 1/2) (2) (3) (3 1/2) (5 1/4) (6) inches thick, (15) (16) (23) (24) inches wide, () long, Type (FS-15, unfaced) (FS-25, faced).

Part 3: Execution

3.1 Curtain Wall Insulation or FIRESPAN Application

Mechanically attach CW insulation to inside of spandrel panels with fasteners approved by the architect.

3.2 Curtain wall insulation must protect aluminum mullions from fire.

3.3 A backing/reinforcement

member must be placed horizontally in back of the curtain wall insulation to prevent bowing of curtain wall insulation due to pressure applied from compression fit safing insulation. Typical reinforcement members include hat channels, "L" and "T" angles.

3.4 Safing Insulation Application

Install THERMAFIBER safing insulation (of proper size, 2"-8" max opening, in safe-off area foil side up between THERMAFIBER curtain wall insulation and floor slabs), on safing clips spaced as needed, 24" o.c. max. (3 clips per 4' batt), leaving no voids. Cut safing wider (1/2" min.) than opening to ensure compression fit. Compress or install on wire hangers in all floor slab openings, to seal completely around telephone cables, ducts, piping or other utilities.

3.5 Fire-Resistant Sealant Application

Seal all joints with 3/8" bead of THERMAFIBER SMOKE SEAL compound. Top off safing insulation in all poke-through openings with minimum 2" depth of THERMAFIBER SMOKE SEAL compound.

3.6 Sound Attenuation Fire Blanket Application

Install THERMAFIBER sound attenuation fire blankets in stud cavities of sound-rated partitions and where required to achieve fire-rated design. Friction fit securely between studs. Butt ends of blankets closely together and fill all voids.

3.7 Ceiling Overlayment Application

Install THERMAFIBER sound attenuation fire blankets over ceiling panels (1 1/2" single or double layer over entire ceiling) (3" over entire ceiling) extending 48" beyond all partitions and tightly fit around all grillage, hangers and other vertical penetrations.

3.8 FS-15 Application

Position THERMAFIBER FS-15 commercial blanket vertically against wall surface. Hold in place with a Z-furring channel according to directions. Position next blanket so that it abuts attached furring member, and hold in place with next furring channel.

3.9 FS-25 Application

Install THERMAFIBER FS-25 commercial blankets in stud cavities where specified. Friction fit securely between studs. Install insulation between floor joists and support blankets with wire mesh, woven tie-wire or flexible metal rods. Butt ends of blankets closely together and fill all voids. For poke-through penetrations, install THERMAFIBER safing insulation in opening.

For further information...

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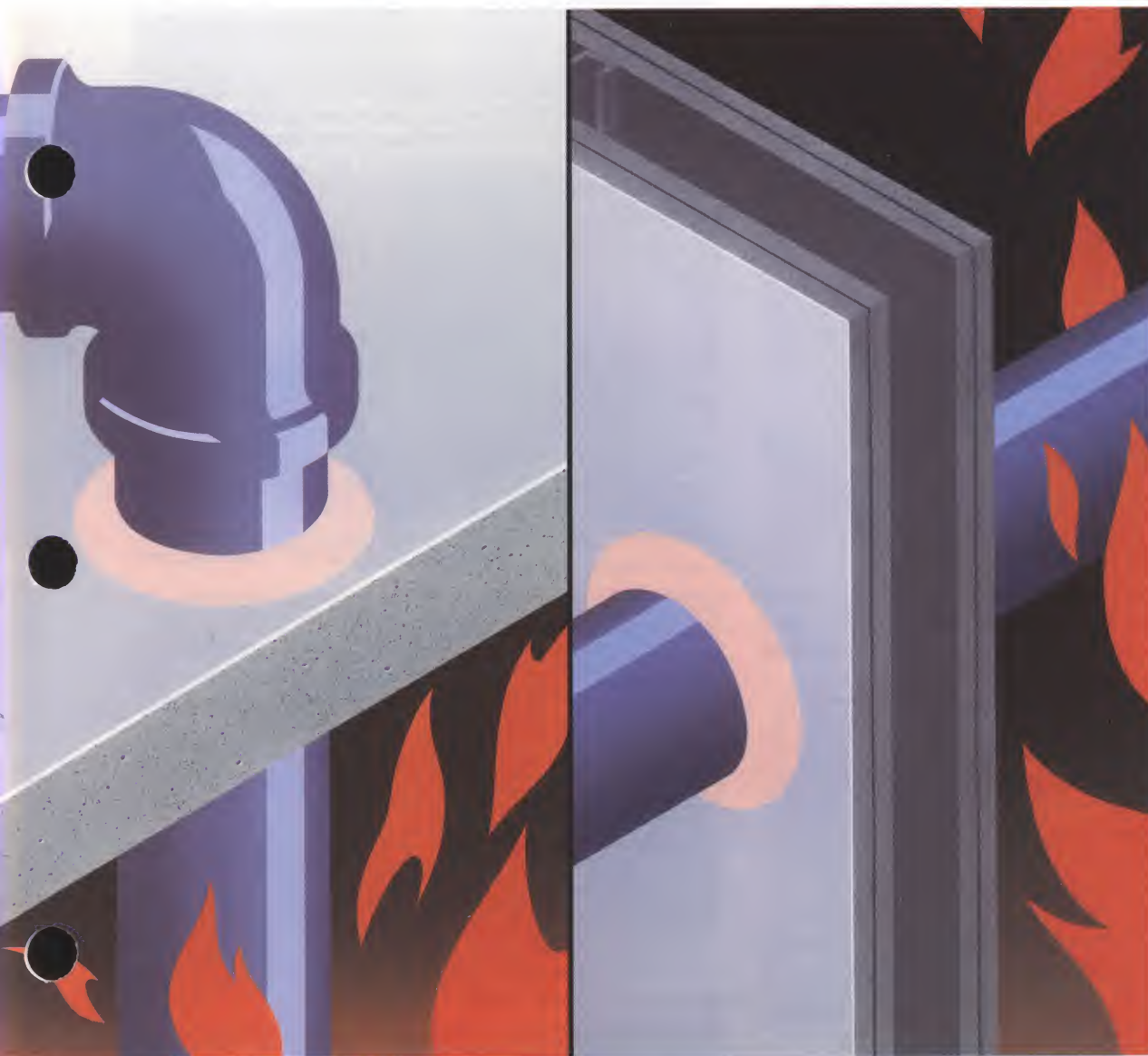
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USG Fire Stop System for Floor and Wall Penetrations



Economical, UL-classified systems utilizing
FIRECODE Compound as a tough, durable firestop

USG

Provides life-safety protection at the lowest cost in the industry

Description

The first priority in building safety is containment of both smoke and fire to the area of origin. An important part of this containment is blocking smoke and flames from passing through openings in concrete floors and gypsum panel walls—electrical and plumbing penetrations, sprinkler systems, etc. All three national building codes have firestopping requirements and fire marshals strictly enforce these requirements.

The USG Fire Stop System employs the newly developed FIRECODE Compound from U.S. Gypsum Company (standard joint compound is unacceptable) for a firestop system that combines both exceptional economy and performance. The system provides protection from fire and smoke to temperatures over 1925°F. It seals out major causes of building fire fatalities, *smoke and toxic gas*, and the major cause of equipment damage, *water*. It also stops dust infiltration and sound leakage.

Features

Low-Cost Leader—FIRECODE Compound comes in 15-lb. bags and mixes easily with water at the jobsite. This makes FIRECODE Compound much more economical to use than competitive products, especially for large scale jobs with lots of different penetrations. One 15-lb. bag provides approx. 517 cu. in. of firestop.

Less Waste—Caulking tube products are frequently discarded with some compound left so there's costly waste. With FIRECODE Compound you mix only what's needed for the application at hand.

Long Working Life—Approx. 75 min. working time; sets in 2-3 hours. Several applications can be made from each batch.

UL-Classified—FIRECODE Compound has met all of the conditions of UL 1479 and ASTM E814 in tests conducted at Underwriters Laboratories. Thirteen different UL-classified through-penetration systems are available: CAJ-0032 (Blank), CAJ-1081 (Pipe) and CAJ-3045 (Cable)—3-hr. fire-rated floor/wall systems; WL-1027 (Pipe), WL-1063 (Pipe), WL-1065 (Pipe), WL-2023 (PVC Pipe), WL-3023 (Cable), WL-7002 (Duct)—2-hr. fire-rated wall systems; and WL-1039 (Pipe), WL-2036 (PVC Pipe), WL-3034 (Cable) and WL-7001 (Duct)—1-hr. fire-rated wall systems. In addition, there is a UL-witnessed fire test of a construction joint assembly.

Non-Combustible—Rated non-combustible as defined by NFPA Standard 220 when tested in accordance with ASTM E136 at Underwriters Laboratories. Surface burning characteristics: flame spread 0, smoke developed 0, when tested in accordance with ASTM E84 at Underwriters Laboratories.

Non-Toxic—The ingredients in FIRECODE Compound are all non-toxic. There are no silicones, no solvents, no halogens, no PCB's, no asbestos or inorganic fibers of any kind. It is rated non-toxic in accordance with the sixth draft of the University of Pittsburgh test method and the LC50 calculated using the Weil method.

Tough, Durable Firestop—FIRECODE Compound forms a very tough, very durable firestop once it has hardened. Has withstood the thermal and mechanical shock of high pressure hose stream testing.

Removable—FIRECODE Compound can be removed in case of retrofit work. This is particularly important for frequently altered penetrations such as those containing telecommunication lines.

Easily Repaired—FIRECODE Compound is *autobonding*, that is, fresh compound will bond to cured compound, a big plus when making repairs due to construction damage or changes to penetrating items. The FIRECODE Compound Repair Procedure has been UL-evaluated and tested to assure that the through-penetration firestop requirements of ASTM E814/UL 1479 are maintained. The simple removal of loose FIRECODE Compound and replacement with

additional FIRECODE Compound is all that is required to repair a damaged through-penetration firestop.

Sound Control—FIRECODE Compound provides tight seal to prevent sound leakage that would otherwise occur through the space between the penetrant and the periphery of the opening.

Easy to Mix—FIRECODE Compound is a lightweight, low density product that mixes quickly and easily with water at jobsite. By changing the amount of water added, the consistency of the compound may be changed to suit the application at hand.

Easy Installation—No special tools are required—simply cut THERMAFIBER Safing Insulation (if required by system) slightly wider than the opening. Compress and tightly fit min. 2½" or 3" thick (per system specifications) insulation with min. density of 3.5 pcf completely around penetrant. Using a trowel, putty knife or spatula, scoop the compound from its container and work it into the penetration opening. Apply compound to a min. ½" or 1" thickness (per system specifications) on top of safing insulation.

Fast-Setting—Once mixed with water, FIRECODE Compound hardens in 2 to 3 hours. And it bonds to concrete, metals, wood and cable jacketing, without the use of primers.

Easily Identifiable—Applied FIRECODE Compound dries to a pale red color which is easily seen and identified by fire marshals.

Easy Cleanup—Soap and water cleanup of tools saves time.

Paintable—Applied FIRECODE Compound may be sanded smooth and painted with either latex or oil-based paints.

Limitations

- 1 FIRECODE Compound should not be applied to moist areas or areas continuously immersed in water.
- 2 FIRECODE Compound's setting action cannot be delayed or prevented by dilution with water.
- 3 The USG Fire Stop System in floor/ceiling applications is not designed to support loads from pedestrian or vehicular traffic.
- 4 FIRECODE Compound is not recommended for sustained extreme high temperature applications. Temperatures of penetrants should not exceed those typically found with domestic hot water systems (approx. 140° F).

Physical Characteristics

Material: vinyl-type non-asbestos formulation.

Color: pale red.

Storage: up to 9 mos. under good storage conditions. Close opened bags as tightly as possible and store in a dry place.

Surface burning characteristics: flame spread 0, smoke developed 0.

Compliance with standards: rated non-combustible as defined by NFPA Standard 220 when tested in accordance with ASTM E136.

Working time: Approx. 75 min.

Setting time: 2-3 hours.

Freezing sensitivity: none after set.

Packaging: 15-lb. (6.7 kg) bag.

Approximate Coverage Rates*

Dry Powder (lbs.)	Approx. Water Additions (pts.)	Wet Mixed Compound (lbs.)	Approx. Applied Firestop (cu. in.)
1	0.5	1.5	33.6
5	2.5	7.7	172.5
7.5	3.8	11.5	257.6
10	5.0	15.4	344.9
15	7.5	23.1	517.4

* Based on approximately 7.5 pints water per 15 lb. bag for wall penetrations. For floor penetrations, approximately 8.3 pints water per 15 lb. bag is recommended and yields approximately 537 cu. in. of applied firestop.

Testing and Classification

Meets ASTM E814: Fire Tests of Through-Penetration Firestops.

Meets UL 1479: Fire Tests of Through-Penetration Firestops.



A. FIRECODE Compound mixes easily with water at jobsite. There's less waste than with caulking tube products.



B. When required by specified system, THERMAFIBER Safing Insulation, the forming material, is fit snugly into penetration.

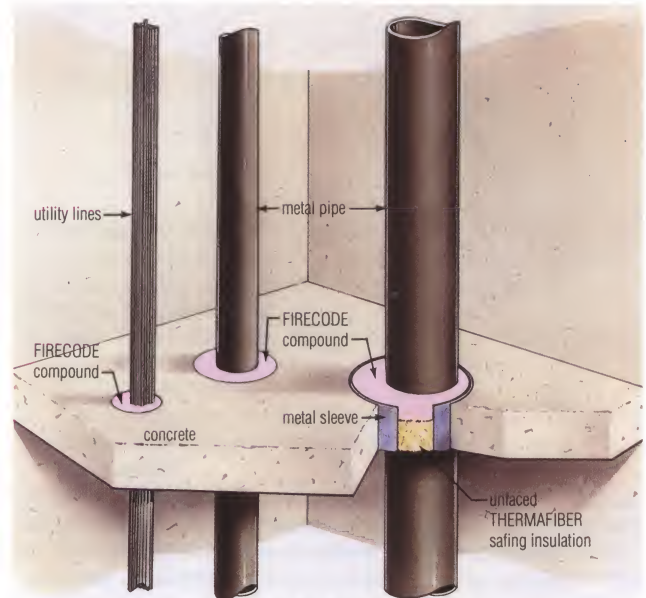


C. FIRECODE Compound is troweled into penetration to block particulate, fire, sound, smoke and air movement through floor (above) and wall (below).



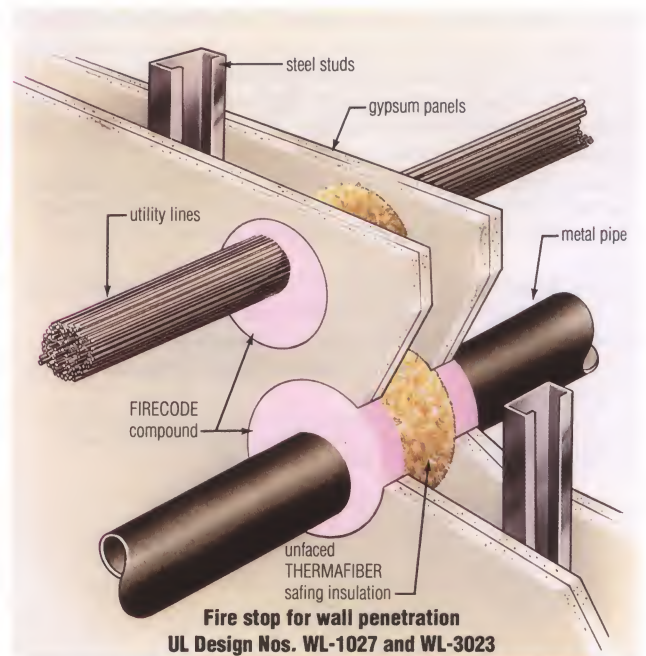
Types of Penetration

USG Fire Stop System is equally effective for both floor and wall penetrations. It works exceptionally well with metallic pipe, conduit and telephone cable. It also works in combination with intumescent wraps and collars (manufactured by others) to form an effective firestop at through-penetrations for materials that can collapse, decompose or disintegrate in fire, such as Schedule 40 plumbing materials made of polyvinyl chloride (PVC).



**Fire stop for floor penetration
UL Design Nos. CAJ-1081 and CAJ-3045**

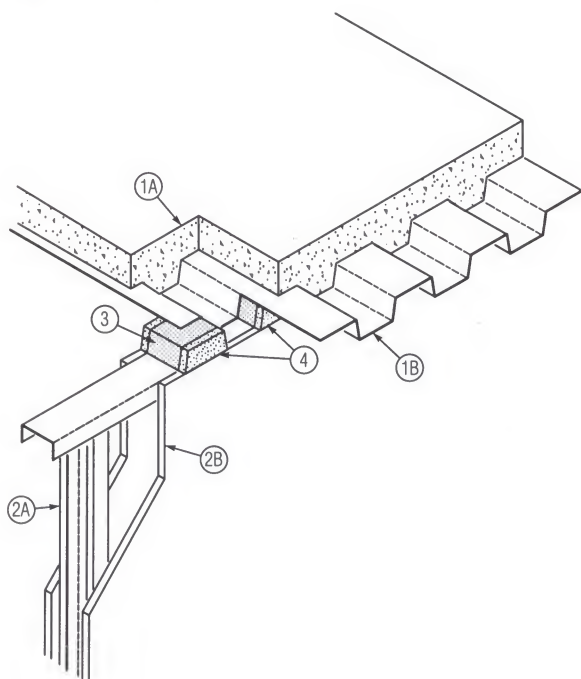
Floor Penetration



**Fire stop for wall penetration
UL Design Nos. WL-1027 and WL-3023**

Wall Penetration

Construction Joint Assembly
U.L. Witnessed Fire Test*



1. Floor Assembly—The fire-rated floor assembly shall be constructed of the materials and in the manner described in the individual designs in the *UL Fire Resistance Directory* and shall include the following construction features:

- A Concrete**—Normal or lightweight concrete having a minimum compressive strength of 3000 psi.
- B Steel Floor and Form Units**—Composite 1½" deep, 24", 30" or 36" wide, galv. or painted steel fluted units. Minimum gauge is 22 msg.

2. Stud/Wallboard Assembly—The fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and the manner described in the individual U300 or U400 Series Wall and Partition Designs in the *UL Fire Resistance Directory* and shall include the following construction features:

- A Studs**—Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom. 2"x4" lumber spaced 16" o.c. Steel studs to be min. 2½" wide and spaced max. 24" o.c.
- B Gypsum Wallboard**—Min. one layer of nom. ½" thick gypsum wallboard each side and min. two layers of nom. ½" thick gypsum wallboard each side for 2-hour rating, as specified in the individual wall and partition design.

3. Forming Material—Min. 2½" thickness of THERMAFIBER Safing Insulation with a min. density of 3.5 pcf—U.L. R-10905 label.

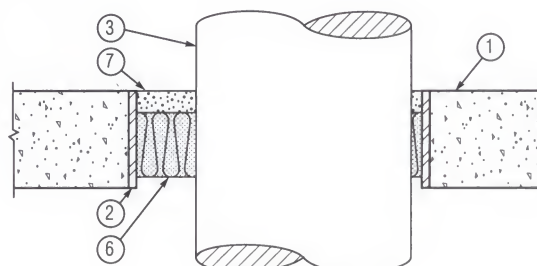
4. Fill Material—Min. ½" depth of FIRECODE Compound installed on each side of wall for 1-hour rating. Min. 1" depth of FIRECODE Compound installed on each side of wall for 2-hour rating.

*Fire test of construction joint assembly described here was UL-witnessed. The construction joint assembly is *not* UL-classified (like the floor and wall assemblies which follow in this publication) because there currently is no UL standard for testing construction joints.

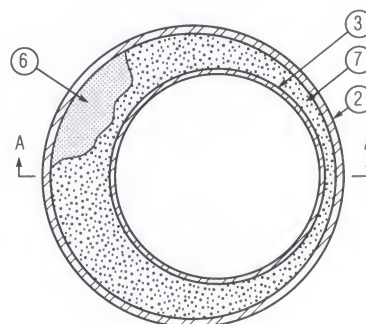
Floor/Wall Assembly—U.L. Systems CAJ-0032 (Blank), CAJ-1081 (Pipe), CAJ-3045 (Cable)* (formerly System 449)

F Rating—3-Hr.

T Rating—0-Hr. & 1-Hr. (see items 3, 4 and 5 below)



Section A-A



1. Floor or Wall Assembly—Min. 4½" thick lightweight or normal weight concrete (100-150 pcf) floor or min. 5" thick concrete wall. Wall may also be constructed of any UL Classified Concrete Blocks.

2. Steel Sleeve—(Optional) Max. 14" diameter Schedule 40 (or heavier) steel sleeve with length equal to thickness of floor or wall.

3. Metallic Pipe—Any of the following may be used:

- Nominal 10" diameter (or smaller) Schedule 10 (or heavier) steel pipe. A min. ¼" to max. 2¾" annular space between pipe and periphery of opening is required. 0-hr. T rating.
- Nominal 4" diameter (or smaller) electrical metallic tubing (EMT) or galvanized steel rigid conduit, or Schedule 5 (or heavier) steel pipe. A min. ¼" to max. 2¾" annular space between pipe and periphery of opening is required. 0-hr. T rating.
- Nominal 14" diameter (or smaller) Schedule 10 (or heavier) steel pipe. A minimum 0" (point contact) to maximum 1½" annular space between the pipe and periphery of opening is required. 2-hour F rating, 0-hour T rating.
- Nominal 6" diameter (or smaller) Type L copper pipe. A minimum 0" (point contact) to maximum 1½" annular space between the pipe and periphery of opening is required. 2-hour F rating, 0-hour T rating.

A maximum of one pipe, tubing or conduit may be installed within the through-opening.

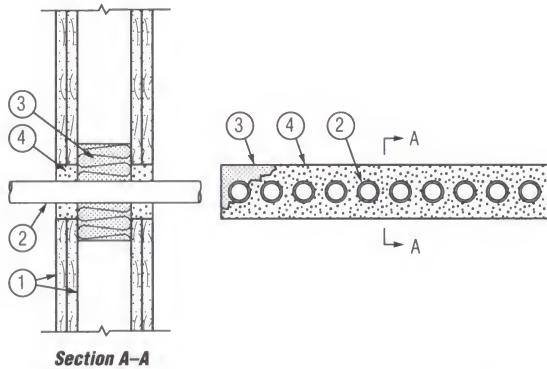
4. Cables—As an option to item 3, min. 10% to max. 40% fill of 100 pair No. 24 AWG telephone cables with polyvinyl chloride insulation and jacket. Cables to be rigidly supported on both sides of wall assembly. Min. ½" to a max. 3½" annular space between the cables and the periphery of the opening is required. 0-hr. T rating.

5. Blank—Maximum diameter of circular through-penetration opening is 8". 1-hr. T rating.

6. Forming Material—Min. 3" of THERMAFIBER Safing Insulation with min. density of 3.5 pcf—U.L. R-10905 label.

7. Fill, Void or Cavity Material—Min. 1" depth of FIRECODE Compound installed on top surface of floor and on each side of the wall..

*Refer to the *UL Fire Resistance Directory for Through-Penetration Firestop Systems* or contact U.S. Gypsum Company for complete information.

Wall Assembly—UL System WL-1065***F Rating—2-Hr.****T Rating—2-Hr.**

1. Wall Assembly—The fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the *UL Fire Resistance Directory* and shall include the following construction features:

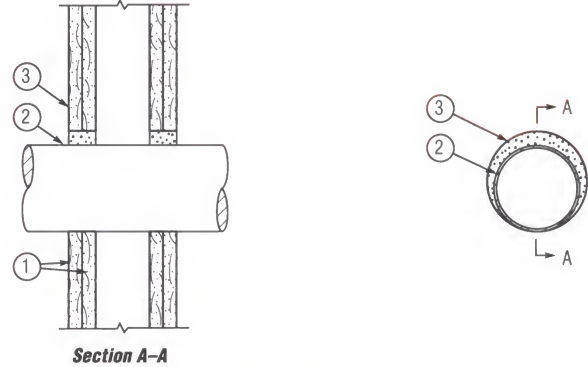
- A Studs**—Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom. 2"x4" lumber spaced 16" o.c. Steel studs to be min. 2½" wide and spaced max. 24" o.c.
- B Gypsum Wallboard**—Two layers of nom. 4' wide by ½" thick gypsum wallboard, as specified in the individual wall and partition design. Max. area of opening is 60 in.² with max. width dimension of 20" and max. height dimension of 3".

2. Pipe or Conduit—Multiple nominal 1" diam. (or smaller) Schedule 10 (or heavier) steel pipes, steel conduits or steel electrical metallic tubing (EMT) to be installed within opening. A clearance of ⅜" to 1¼" shall be maintained between pipes, conduits and/or tubes. Annular space between pipes, conduits and tubes and edge of opening to be min. ⅜" to max. 1¼". Pipes, conduits and tubes to be rigidly supported on both sides of wall assembly.

3. Forming Material—Min. 3" of THERMAFIBER Safing Insulation with min. density of 3.5 pcf—U.L. R-10905 label.

4. Fill, Void or Cavity Material—Min. 1" depth of FIRECODE Compound applied to fill opening flush with both surfaces of wall.

*Refer to the *UL Fire Resistance Directory for Through-Penetration Firestop Systems* or contact U.S. Gypsum Company for complete information.

Wall Assembly—UL System WL-1063***F Rating—2-Hr.****T Rating—1-Hr.**

1. Wall Assembly—The fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the *UL Fire Resistance Directory* and shall include the following construction features:

- A Studs**—Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom. 2"x4" lumber spaced 16" o.c. Steel studs to be min. 2½" wide and spaced max. 24" o.c.
- B Gypsum Wallboard**—Two layers of nom. ½" thick gypsum wallboard, as specified in the individual wall and partition design. Max. diam. of opening is 4⅝".

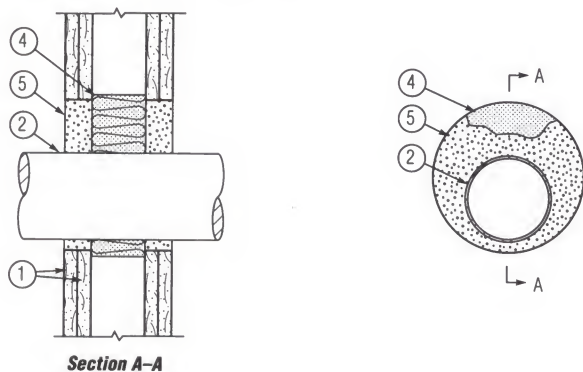
2 Through Penetrants—One metallic pipe, conduit or tube to be installed within opening. The annular space shall be min. 0" (point contact) to max. ½". Pipe, conduit or tube to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes, conduit or tubing may be used:

- A Steel Pipe**—Nom. 3½" diam. (or smaller) Schedule 10 (or heavier) steel pipe.
- B Conduit**—Nom. 3½" diam. (or smaller) electrical metallic tubing (EMT) or steel conduit.
- C Copper Tubing**—Nom. 4" diam. (or smaller) Type L (or heavier) copper tubing.

3. Fill, Void or Cavity Material—Min. 1" depth of FIRECODE Compound applied within the annulus, flush with both surfaces of wall.

*Refer to the *UL Fire Resistance Directory for Through-Penetration Firestop Systems* or contact U.S. Gypsum Company for complete information.

Wall Assembly—U.L. Systems WL-1027 (Pipe), WL-3023 (Cable)*
F Rating—2-Hr. (formerly System 450)
T Rating—0-Hr.



1. Wall Assembly—Any 2-hr. fire-resistant gypsum panel wall assembly. Joints finished with SHEETROCK Joint Tape and Compound; fasteners finished with SHEETROCK Joint Compound.

2. Metallic Pipe—Either of following may be used:

- Nominal 4" diameter (or smaller) electrical metallic tubing (EMT) or galvanized steel rigid conduit, or Schedule 5 (or heavier) steel pipe. A min. 1/4" to max. 2 1/4" annular space between pipe and periphery of opening is required.
- Nominal 6" diameter (or smaller) trade size copper pipe. A minimum 1" to maximum 1 1/2" annular space between pipe and periphery of opening is required.

A maximum of one pipe, tubing or conduit may be installed within the through-opening.

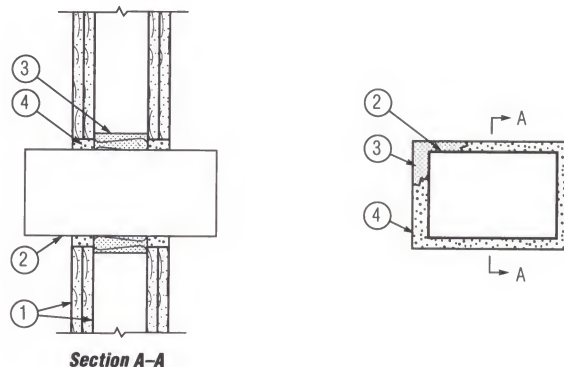
3. Cables—As an option to item 2, min. 10% to max. 40% fill of 100 pair No. 24 AWG telephone cables with polyvinyl chloride insulation and jacket. Cables to be rigidly supported on both sides of wall assembly. Min. 1/4" to a max. 4 1/2" annular space between the cables and the periphery of the opening is required.

4. Forming Material—Min. 3" of THERMAFIBER Safing Insulation with min. density of 3.5 pcf—U.L. R-10905 label.

5. Fill, Void or Cavity Material—Min. 1" depth of FIRECODE Compound installed on each side of the wall.

*Refer to the UL Fire Resistance Directory for Through-Penetration Firestop Systems or contact U.S. Gypsum Company for complete information.

Wall Assembly—UL System WL-7002*
F Rating—2-Hr.
T Rating—1/2-Hr.



1. Wall Assembly—The fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the *UL Fire Resistance Directory* and shall include the following construction features:

A Studs—Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom. 2"x4" lumber spaced 16" o.c. Steel studs to be min. 2 1/2" wide and spaced max. 24" o.c.

B Gypsum Wallboard—Two layers of nom. 1/2" thick gypsum wallboard, as specified in the individual wall and partition design. Max. area of opening is 40 in.² with max. dimension of 8".

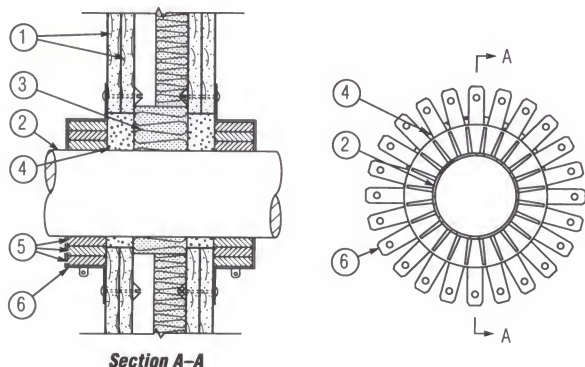
2. Air Duct—Nom. 4"x6" prefabricated No. 28 MSG galv. sheet metal air duct. A min. 1/2" to max. 1" annular space is required within the firestop system. Air duct to be rigidly supported on both sides of wall assembly.

3. Forming Material—Min. 3" of THERMAFIBER Safing Insulation with min. density of 3.5 pcf—U.L. R-10905 label.

4. Fill, Void or Cavity Material—Min. 1" depth of FIRECODE Compound applied to fill the annulus, flush with both surfaces of wall.

*Refer to the UL Fire Resistance Directory for Through-Penetration Firestop Systems or contact U.S. Gypsum Company for complete information.

Wall Assembly—U.L. Systems WL-2023* (formerly System 510)
F Rating—2-Hr.
T Rating—1-Hr.



1. Wall Assembly—Any 2-hr. fire-resistant gypsum panel wall assembly. Joints finished with SHEETROCK Joint Tape and Compound; fasteners finished with SHEETROCK Joint Compound.

2. Nonmetallic Pipe—Nominal 4" diameter (or smaller) Schedule 40 (or heavier) polyvinyl chloride (PVC) pipe. A nominal 3/4" annular space between pipe and periphery of opening is required. A maximum of one pipe may be installed within the through-opening.

3. Forming Material—Min. 3" of THERMAFIBER Safing Insulation with min. density of 3.5 pcf—U.L. R-10905 label.

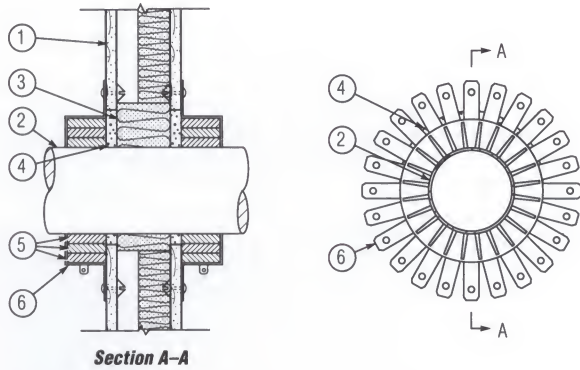
4. Fill, Void or Cavity Material—Min. 1" depth of FIRECODE Compound installed on each side of the wall.

5. Wrap Strip—Three layers of nom. 1/4" thick by 2" wide intumescent wrap strip installed on each surface of the wall.

6. Steel Collar—Collar fabricated from precut 0.016" thick galv. sheet steel. Nominal 2" deep collar with 1" wide by 2" long anchor tabs secured to the wall with 1/8" diam. by 3" long steel toggle bolts. One collar installed on each surface of the wall.

*Refer to the UL Fire Resistance Directory for Through-Penetration Firestop Systems or contact U.S. Gypsum Company for complete information.

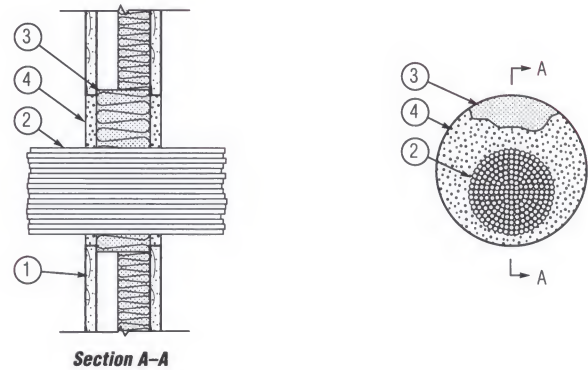
Wall Assembly—U.L. System WL-2036* (formerly System 604)
F Rating—1-Hr.
T Rating—1-Hr.



- 1. Wall Assembly**—Any 1-hr. fire-resistant gypsum panel wall assembly. Joints finished with SHEETROCK Joint Tape and Compound; fasteners finished with SHEETROCK Joint Compound.
- 2. Nonmetallic Pipe**—Nominal 4" diameter (or smaller) Schedule 40 (or heavier) polyvinyl chloride (PVC) pipe. A min. $\frac{5}{16}$ " to max. $1\frac{1}{16}$ " annular space between pipe and periphery of opening is required. A maximum of one pipe may be installed within the through-opening.
- 3. Forming Material**—Min. $2\frac{1}{2}$ " of THERMAFIBER Safing Insulation with min. density of 3.5 pcf—U.L. R-10905 label.
- 4. Fill, Void or Cavity Material**—Min. $\frac{1}{2}$ " depth of FIRECODE Compound installed on each side of the wall.
- 5. Wrap Strip**—Three layers of nom. $\frac{1}{4}$ " thick by 2" wide intumescent wrap strip installed on each surface of the wall.
- 6. Steel Collar**—Collar fabricated from precut 0.016" thick galv. sheet steel. Nominal 2" deep collar with 1" wide by 2" long anchor tabs secured to the wall with $\frac{1}{8}$ " diam. by 3" long steel toggle bolts. One collar installed on each surface of the wall.

*Refer to the UL Fire Resistance Directory for Through-Penetration Firestop Systems or contact U.S. Gypsum Company for complete information.

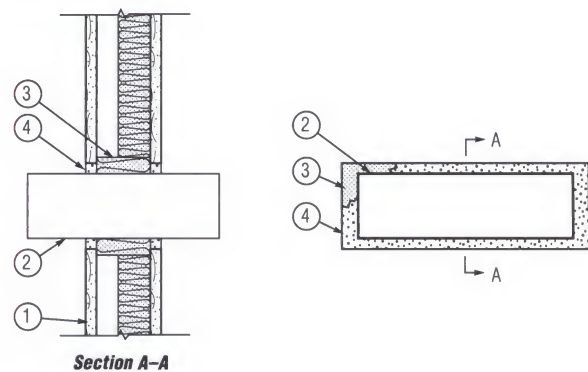
Wall Assembly—U.L. System WL-3034* (formerly System 606)
F Rating—1-Hr.
T Rating—0-Hr. & 1-Hr. (see item 2 below)



- 1. Wall Assembly**—Any 1-hr. fire-resistant gypsum panel wall assembly. Joints finished with SHEETROCK Joint Tape and Compound; fasteners finished with SHEETROCK Joint Compound.
- 2. Cables**—Min. 10% to max. 40% fill of 100 pr. No. 24 AWG telephone cables with polyvinyl chloride insulation and jacket. Min. $\frac{1}{2}$ " to max. $\frac{3}{8}$ " annular space between cables and periphery of opening is required. Cables to be rigidly supported on both sides of the wall assembly. 10% fill for 1-hr. T rating; 40% fill for 0-hr. T rating.
- 3. Forming Material**—Min. $2\frac{1}{2}$ " of THERMAFIBER Safing Insulation with min. density of 3.5 pcf—U.L. R-10905 label.
- 4. Fill, Void or Cavity Material**—Min. $\frac{1}{2}$ " depth of FIRECODE Compound installed on each side of the wall.

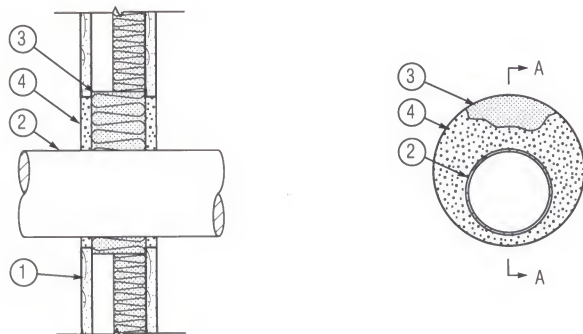
*Refer to the UL Fire Resistance Directory for Through-Penetration Firestop Systems or contact U.S. Gypsum Company for complete information.

Wall Assembly—U.L. System WL-7001* (formerly System 607)
F Rating—1-Hr.
T Rating—0-Hr.



- 1. Wall Assembly**—Any 1-hr. fire-resistant gypsum panel wall assembly. Joints finished with SHEETROCK Joint Tape and Compound; fasteners finished with SHEETROCK Joint Compound.
- 2. Air Duct**—Nominal 3" by 10" prefabricated 24 ga. sheet metal air duct. Min. $\frac{1}{16}$ " to max. 1" annular space between duct and periphery of opening is required. Air duct to be rigidly supported on both sides of the wall assembly.
- 3. Forming Material**—Min. $2\frac{1}{2}$ " of THERMAFIBER Safing Insulation with min. density of 3.5 pcf—U.L. R-10905 label.
- 4. Fill, Void or Cavity Material**—Min. $\frac{1}{2}$ " depth of FIRECODE Compound installed on each side of the wall.

*Refer to the UL Fire Resistance Directory for Through-Penetration Firestop Systems or contact U.S. Gypsum Company for complete information.

Wall Assembly—U.L. System WL-1039* (formerly System 605)**F Rating—1-Hr.****T Rating—0 & 1-Hr. (see item 2 below)****Section A-A**

1. Wall Assembly—Any 1-hr. fire-resistant gypsum panel wall assembly. Joints finished with SHEETROCK Joint Tape and Compound; fasteners finished with SHEETROCK Joint Compound.

2. Metallic Pipe—Any of following may be used:

- Nominal 4" diameter (or smaller) Schedule 10 (or heavier) steel pipe. A min. 1/4" to max. 1 1/4" annular space between pipe and periphery of opening is required—0-hr. T Rating.
- Nominal 4" diameter (or smaller) cast or ductile iron pipe. A min. 1/4" to max. 1 1/4" annular space between pipe and periphery of opening is required—0-hr. T Rating.
- Nominal 4" diameter (or smaller) electrical metallic tubing or steel conduit. A min. 1/4" to max. 1 1/4" annular space between pipe and periphery of opening is required. A 1/2" diameter (or smaller) electrical metallic tubing or steel conduit has 1-hr. T Rating; larger than 1/2" diameter has 0-hr. T Rating.
- Nominal 3/4" diameter (or smaller) Type L (or heavier) copper tubing. A min. 1/4" to max. 1 1/4" annular space between pipe and periphery of opening is required—0-hr. T Rating.
- Nominal 4" diameter (or smaller) Type L (or heavier) copper pipe. A min. 3/8" to max. 1 1/4" annular space between pipe and periphery of opening is required—0-hr. T Rating.

3. Forming Material—Min. 2 1/2" of THERMAFIBER Safing Insulation with min. density of 3.5 pcf—U.L. R-10905 label.

4. Fill, Void or Cavity Material—Min. 1/2" depth of FIRECODE Compound installed on each side of the wall.

* Refer to the UL Fire Resistance Directory for Through-Penetration Firestop Systems or contact U.S. Gypsum Company for complete information.

Good Design Practices

- 1 System Performance**—United States Gypsum Company will provide test certification for published fire and structural data covering systems designed and constructed according to its published specifications. Tests are conducted on Company products assembled to meet performance requirements of established test procedures specified by various agencies. System performance following substitution of materials or compromise in assembly design cannot be certified; failure may result under critical conditions.
- 2 Additional Information**—See your sales representative or refer to technical folder SA-707 THERMAFIBER Life-Safety Fire Containment Systems in this series.
- 3 Floor/Ceiling Applications**—USG Fire Stop System installed in floor/ceiling applications is not designed to support loads from pedestrian or vehicular traffic.

Part 1: General

1.1 Scope—Specify to meet requirements.

1.2 Qualifications

All materials, unless otherwise indicated, shall be manufactured by

United States Gypsum Company or USG Interiors, Inc., and shall be installed in accordance with their current printed directions.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Environmental Conditions

In cold weather, installation of FIRECODE Compound shall not begin until building is enclosed, with permanent heating and cooling in operation, and building temperatures maintained above 40°F. Maintain min. surface, water, mix and air temperature of 40°F during application. Adequate ventilation shall be provided to carry off excess moisture. Not to be applied to moist surfaces or areas continuously immersed in water. Not recommended for sustained extreme high temperature applications. Temperatures should not exceed those typically found with domestic hot water systems (approx. 140°F).

Part 2: Products**2.1 Materials**

- A** Forming material (if required by system): THERMAFIBER Safing Insulation, unfaced, 4" thick, () wide, () long.
- B** Firestopping: FIRECODE Compound, 15-lb. bag.

Part 3: Execution**3.1 Safing Insulation Application**

Clean substrate of dirt, dust, grease, oil, efflorescence, loose material or other matter.

With a serrated knife, cut THERMAFIBER Safing Insulation slightly wider than the opening. Compress and tightly fit min. 2 1/2" or 3" thickness (per system specifications) of insulation with min. density of 3.5 pcf completely around penetrant.

3.2 Firestopping Compound Application

Mix FIRECODE Compound according to directions on bag.

Using a trowel, putty knife or spatula, scoop the compound from its container and work it into the penetration opening. Apply compound to min. 1/2" or 1" thickness (per system specifications) on top of safing insulation. Ensure that compound is in contact with all surfaces and that entire opening is filled with safing and compound.

Product Information and Literature: 1-800-USG-4YOU (1-800-874-4968).

Sales Offices: Arizona: Phoenix, (602) 866-0795 • California: Fremont, (510) 792-4400, Glendale, (818) 956-1882 • Florida: Jacksonville, (904) 764-3293, Miami, (305) 557-4501 • Georgia: Atlanta, (404) 393-0770 • Hawaii: Honolulu, (808) 591-8815 • Illinois: Chicago, (312) 606-5488 • Indiana: Indianapolis, (317) 848-1513 • Louisiana: New Orleans, (504) 241-2020 • Maryland: Baltimore, (410) 355-2200 • Massachusetts: Charlestown, (617) 241-8530 • Michigan: Southfield, (313) 569-1900 • Minnesota: Bloomington, (612) 854-4233 • Missouri: St. Louis, (314) 349-0980 • New York: Albany, (518) 458-7437, Stony Point, (914) 786-2820 • North Carolina: Charlotte, (704) 552-7402 • Ohio: Cleveland, (216) 899-7333 • Oregon: Beaverton, (503) 626-8864 • Pennsylvania: Philadelphia, (410) 355-2200, Pittsburgh, (800) 289-4874 • Tennessee: Nashville, (615) 361-8419 • Texas: Dallas, (214) 490-0771, Houston, (713) 868-9937 • Utah: Salt Lake City, (801) 266-4975 • Virginia: Richmond, (804) 285-7528 • International Division: Chicago, (312) 606-5840.

Trademarks: The following trademarks used herein are owned by United States Gypsum Company: FIRECODE, SHEETROCK, THERMAFIBER, USG.

Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

Notice: We shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Our liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered.

Metric Specifications USG Corporation, through its operating subsidiaries, will provide metric conversions on its products and systems to help specifiers match metric design sizes. In addition, some products are available in metric dimensions from selected manufacturing plants. Refer to SA-100 Construction Selector for additional information and a Table of Metric Equivalents.

United States Gypsum Company

125 South Franklin Street
P.O. Box 806278
Chicago, Illinois 60680-4124
A Subsidiary of USG Corporation

D O N N

Ceiling Suspension Systems

S A 9 0 4

USG Interiors, Inc.



USG

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DONN Suspension Systems From USG Interiors, Inc.

Precision engineering, modern styling and color correctness. Offering quality without compromise, the DONN line of suspension products is the most complete selection of suspension systems available in the commercial building industry.

All DONN suspension systems are designed for esthetics, strength, and fast, easy installation. In addition to visual appeal, these systems provide special features such as automatic panel centering and plug-in positive lock insertion, which save time and money.

Cover: FINELINE 1/8 Suspension/ECLIPSE Panels

Below: FINELINE Suspension/ECLIPSE Square-to-Square Panels



Exposed Suspension Systems

DX, DXL, DXLA These systems are the most widely used acoustical suspension systems. They offer maximum economy, design simplicity and plenum access in a standard $15/16"$ exposed grid system.

Features

- High tensile steel connection clips on cross tee ends provide plug-in positive-lock insertion for quick installation
- Exceptional tension and compression connection values without additional wires, clips, fasteners or pins
- Cross tees with override ends resist twisting and give a professionally finished appearance
- Meets or exceeds all national code requirements, including seismic
- Proven corrosion-resistant coating

Item No.	Class	Length	Height	Tested Load (lbs./LF)		
				4' Hanger Spacing	5' Hanger Spacing	6' Hanger Spacing
Main Tee						
DX 24	Intermediate	12'	1 1/2"	12.4	6.1	3.6
DX 26	Heavy Duty	12'	1 1/2"	16.3	7.3	4.9
Item No.		Length	Height	Tested Load (lbs./LF)		
Cross Tee						
DX 216		2'	1"	17.1		
DX 316		3'	1"	10.1		
DX 416		4'	1"	5.0		
DX 422		4'	1 1/2"	8.2		
DX 522		5'	1 1/2"	4.3		
DX 424		4'	1 1/2"	13.7		
DX 524		5'	1 1/2"	6.4		

Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360. For DXL/DXLA load data, see technical data offered by your USG Interiors representative.

Item No.	Class	Length	Height	Tested Load (lbs./LF)		
				4' Hanger Spacing	5' Hanger Spacing	6' Hanger Spacing
Main Tee						
DXW 26	Heavy Duty	12'	1½"	16.3	7.3	4.9
Item No.		Length	Height	Tested Load (lbs./LF)		
Cross Tee						
DXW 224		2'	1½"	65.0		
DXW 424		4'	1½"	13.7		
DXW 524		5'	1½"	6.4		

Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.

DX

DXL

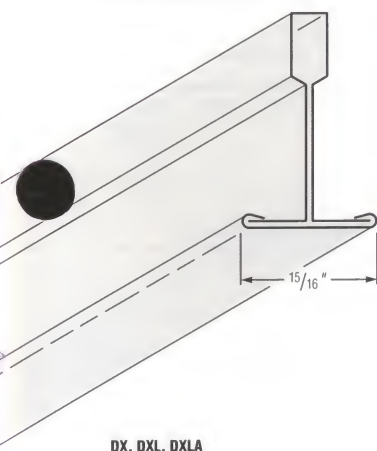
DXLA

DXW

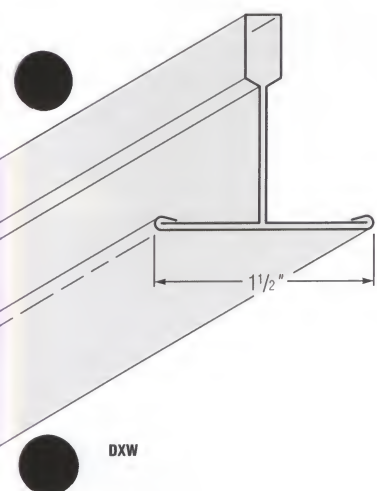
DX system: Class A, double web steel tee and cap. 32 standard finishes.

DXL system: Fire-rated, double web steel tee and cap. 32 standard finishes. More than 60 UL Designs up to 3 hours.

DXLA system: Fire-rated, double web steel tee and aluminum cap. 29 standard finishes. More than 60 UL Designs up to 3 hours.



DX, DXL, DXLA



DXW

Narrow Suspension Systems

FINELINE An innovative, narrow-profile, slotted ceiling grid. Its mitered intersections offer a clean, tailored appearance. $\frac{1}{4}$ " center reveal.

Features

- High tensile steel connection clips on cross tee ends provide plug-in positive-lock insertion for quick installation
- Exceptional tension and compression connection values for seismic efficiency without additional wires, clips, fasteners or pins
- Choice of module sizes
- Fire-rated assemblies available
- DONN air diffuser assemblies integrate with FINELINE grid and acoustical panels for a clean, uninterrupted ceiling plane

FINELINE 1/8 A narrow-profile, slotted grid similar to FINELINE grid, but with a $\frac{1}{8}$ " reveal rather than a $\frac{1}{4}$ " reveal.

Features

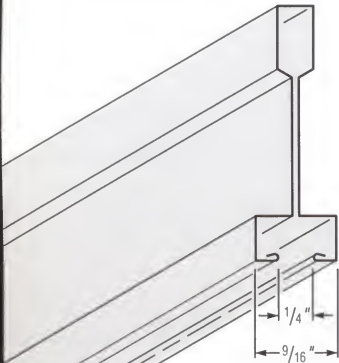
- High tensile steel connection clips on cross tee ends provide plug-in positive-lock insertion for quick installation
- Exceptional tension and compression connection values for seismic efficiency without additional wires, clips, fasteners or pins
- Class A only
- Choice of module sizes: 2'x2', 2'x4', and 30"x30"
- Available in Flat White and 24 standard colors
- Integrates with DONN air diffuser assemblies for a clean, uninterrupted ceiling plane

FINELINE

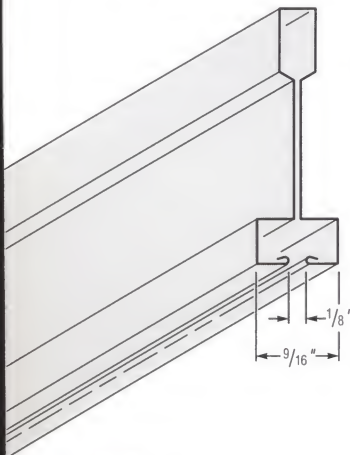
FINELINE 1/8

FINELINE system: Available in all white, white with black reveal, and 24 standard colors.

FINELINE With Inside Color system: Outside color of black or white with contrasting reveal of red, yellow, royal blue or turquoise. Effective use of bright color—perfect with black or white ceiling panels.



FINELINE



FINELINE 1/8

Item No.	Class	Length	Height	Tested Load (lbs./LF)		
				4' Hanger Spacing	5' Hanger Spacing	6' Hanger Spacing
Main Tee						
DXF 29	Intermediate	12'	1 ³ / ₁₆ "	12.3	6.6	3.6
DXFH 29	Heavy Duty	12'	1 ³ / ₁₆ "	16.7	8.3	4.9
Item No.		Length	Height	Tested Load (lbs./LF)		
Cross Tee						
DXF 229		2'	1 ³ / ₁₆ "	59.8		
DXF 429 N		4'	1 ³ / ₁₆ "	13.5		
DXF 529 N		5'	1 ³ / ₁₆ "	6.9		

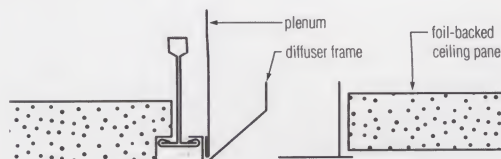
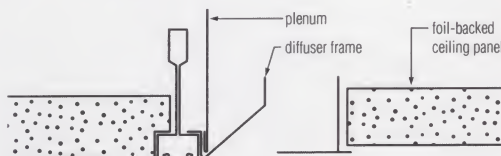
Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.

				Tested Load (lbs./LF)		
				4' Hanger Spacing	5' Hanger Spacing	6' Hanger Spacing
Item No.	Class	Length	Height			
Main Tee						
DXFF 2924	Intermediate	12'	1 ²⁵ / ₁₆ "	12.3	6.6	3.6
DXFF 2924	Heavy Duty	12'	1 ²⁵ / ₁₆ "	16.7	8.3	4.9
Item No.		Length	Height	Tested Load (lbs./LF)		
Cross Tee						
DXFF 229		2'	1 ²⁵ / ₁₆ "	59.8		
DXFF 429 N		4'	1 ²⁵ / ₁₆ "	13.5		

Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.

DONN Air Diffuser

- Compatible with all USG Interiors $\frac{9}{16}$ " narrow suspension systems: CENTRICITEE, FINELINE, FINELINE 1/8, MERIDIAN, and Highline
- Available in 1- 2- 3- or 4-slot styles



Narrow Suspension Systems

MERIDIAN Combines the esthetics of more expensive screw-slot grid with the function and utility of exposed grid. Its unique, round-ed $\frac{5}{32}$ " reveal softens the effect of grid lines to enhance the finished look.

Features

- Automatic centering of panels and light fixtures
- High tensile steel connection clips on cross tee ends provide plug-in positive-lock insertion for quick installation
- Exceptional tension and compression connection values for seismic efficiency without additional wires, clips, fasteners or pins
- 31 standard finishes
- Class A only

Item No.	Class	Length	Height	Tested Load (lbs./LF)	
				4' Hanger Spacing	5' Hanger Spacing
Main Tee					
DXM 24	Intermediate	12'	1½"	12.4	6.5
Item No.		Length	Height	Tested Load (lbs./LF)	
Cross Tee					
DXM 224		2'	1½"	50.4	
DXM 424		4'	1½"	8.1	
DXM 524		5'	1½"	4.3	

Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.

Highline A narrow-faced extruded aluminum screw-slot grid with crisp edge detail.

Features

- Smooth, medium, and heavy textures available, including the option of a contrasting black reveal
- Provides an uninterrupted reveal for a trim, finished appearance
- Class A only
- For complete product information, contact your USG Interiors representative

Item No.	Class	Length	Height
<i>Main Tee</i>			
HIC/HCC 3012N24	Intermediate	12'	1½"
HIC/HCC 3612N24	Heavy Duty	12'	2¼"
Item No.		Length	Height
<i>Cross Tee</i>			
HIC/HCC 2424		2'	1½"
HIC/HCC 4830		4'	1½"
HIC/HCC 4830N		4'	1½"

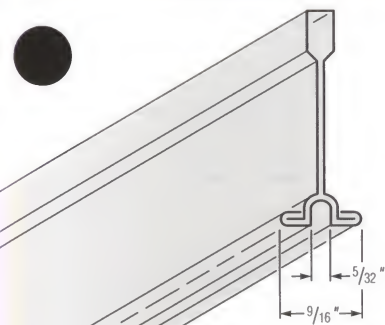
CENTRICITEE Presents a subtle, narrow-line alternative to $\frac{15}{16}$ " exposed grid. Fire-rated assemblies available up to 2 hours.

Features

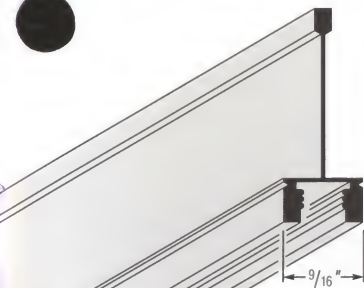
- Patented, automatic panel-centering devices built into each grid member
- Meets or exceeds all national code requirements, including seismic
- 29 standard finishes

Item No.	Class	Length	Height	Tested Load (lbs./LF)	
				4' Hanger Spacing	5' Hanger Spacing
Main Tee					
DXT 24	Intermediate	12'	1½"	12.2	6.6
DXT 26	Heavy	12'	1½"	16.0	7.3
Item No.		Length	Height	Tested Load (lbs./LF)	
Cross Tee					
DXT 218		2'	1½"	21.2	
DXT 418		4'	1½"	5.0	
DXT 424		4'	1½"	12.2	
DXT 524		5'	1½"	6.7	

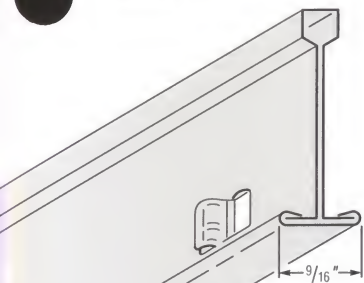
Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.



MERIDIAN



Highline



CENTRICITEE

Environmental Suspension Systems

ZXA, ZXLA Double web, hot-dipped galvanized steel tee, painted aluminum cap, and stainless steel DX clips for complete corrosion resistance.

Features

- Ideal for high humidity areas
- Strength exceeds comparable all-aluminum systems
- High tensile steel connection clips on cross tee ends provide plug-in positive-lock insertion for quick installation
- Cross tees with override ends resist twisting and give a professionally finished appearance

AX Double web aluminum tee, aluminum cap, and stainless steel DX clips.

Features

- Noncorrosive, easy-to-handle system for high humidity areas
- High tensile steel connection clips on cross tee ends provide plug-in positive-lock insertion for quick installation
- Cross tees with override ends resist twisting and give a professionally finished appearance

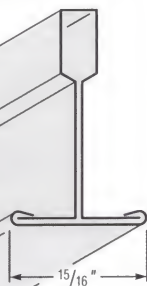
ZXA

ZXLA

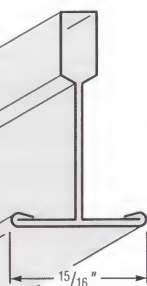
AX

ZXA system: Class A.

ZXLA system: Fire-rated ZXLA is accepted in all DXLA designs.



ZXA, ZXLA



AX

				Tested Load (lbs./LF)		
Item No.	Class	Length	Height	4' Hanger	5' Hanger	6' Hanger
				Spacing	Spacing	Spacing
Main Tee						
ZXA/ZXLA 24	Intermed.	12'	1½"	12.4	6.1	3.6
ZXA/ZXLA 26	Heavy	12'	1½"	16.0	7.3	4.9
Item No.		Length	Height	Tested Load (lbs./LF)		
Cross Tee						
ZXA/ZXLA 224		2'	1½"	65.0		
ZXA/ZXLA 424		4'	1½"	13.7		
ZXA/ZXLA 524		5'	1½"	6.4		

Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.

Item No.	Class	Length	Height	Tested Load (lbs./LF)	
				3' Hanger Spacing	4' Hanger Spacing
Main Tee					
AX 26	Light Duty	12'	1½"	16.0	6.9
Item No.		Length	Height	Tested Load (lbs./LF)	
Cross Tee					
AX 224		2'	1½"	22.8	
AX 424		4'	1½"	5.2	

Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.



DX Concealed Grid

Drywall Suspension Grid

DX Concealed Grid

RIGID X

Concealed Suspension System

DX Concealed Grid This system allows the supporting grid to be completely concealed, giving a monolithic, uninterrupted ceiling plane.

Features

- Concealed systems are available to accommodate a variety of upward or downward access requirements
- Light fixtures, air diffusers, and plenum access points can be arranged with great flexibility
- Fire-rated assemblies are available

Item No.	Length	Height	Tested Load (lbs./LF)
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Tee Splines

DE 209	2'	1/2"	3.4
DT 316	3'	1"	10.0
DT 416/DE 415	4'	1"	5.0
DT 416/DEN 415	4'	1"	3.0

Item No.	Length	Height	Tested Load (lbs./LF)
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BPA 216	2'	1"	20.0
BPA 316	3'	1"	6.0
BPA 416	4'	1"	4.5
BPA 224	2'	1 1/8"	35.0
BPA 324	3'	1 1/8"	16.0
BPA 424	4'	1 1/8"	6.0
BPA 524	5'	1 1/8"	3.5
FCC/FCZ	2'	3/4"	5.5

Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.

Drywall Suspension System

RIGID X This system is the ideal solution for screw-attaching drywall to a direct hung suspension.

Features

- Combines the installation speed of grid and the durability of black iron furring channel systems into one unique system
- Modular components and knurled face on furring cross channels and furring cross tees for faster screw installation
- Accepts standard lay-in light fixtures and air diffusers
- Many fire-rated designs are available
- Accepts U.S. Gypsum Company SHEETROCK® brand gypsum panels

Item No.	Class	Length	Height	Tested Load (lbs./LF) ¹
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Item No.	Class	Length	Height	4' Hanger Spacing
RMX 12	Heavy Duty	12'	1 1/2"	17.0

Item No.	Length	Height	Maximum Allowable Load (lbs.)
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RCX 4 Cross Channel	4'	7/8"	7.4 ²
DXLG 424	4'	1 1/2"	13.7
DXL 424	4'	1 1/2"	13.7

1. Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.

2. Calculated based on moment of inertia Ixx = .0112 in.⁴

Fire-Rated Assemblies

DXL Fire-Rated Assemblies

3 hr.: A-207, G-211, G-213
2 hr.: A-207, D-215, G-204, G-211, G-213, G-222, G-231
1 1/2 hr.: G-259
1 hr.: G-201, L-206, P-214, P-230, P-238, P-255

CENTRICITEE Fire-Rated Assemblies

2 hr.: G-265
1 1/2 hr.: G-262

FINELINE Fire-Rated Assemblies

1 1/2 hr.: G-264
1 hr.: P-254
3/4 hr.: P-254

RIGID X Fire-Rated Assemblies

3-hr.: G-523, G-529, J-502
2-hr.: G-523, G-526, G-529, J-502

1 1/2 hr.: G-528, P-506, P-507, P-510, P-513

1 hr.: L-525, L-529, P-507, P-510

Additional DXL Fire-Rated Assemblies

3 hr.: G-229
2 hr.: A-202, D-208, G-208, G-209, G-218, G-229, G-236, G-243, G-250, G-258 [Concealed systems D-010, G-022]
1 1/2 hr.: A-210, G-229, G-241, G-243, L-208, P-225, P-227, P-231, P-251
1 hr.: G-241, L-206, L-209, L-210, L-212, P-206, P-210, P-225, P-227, P-244, P-245, P-257, P-509, P-513
3/4 hr.: P-204

Additional RIGID X Fire-Rated Assemblies

1 1/2 hr.: P-513
1 hr.: L-502, L-506, L-526, P-509

Limitations

Special Environmental Requirements:
For panels in exposed grids in non-fire-rated high-humidity applications, use aluminum or ZXA suspension systems. For fire-rated application, use ZXLA. For exterior applications, suspension system should be approved by manufacturer for outdoor use.

L.A. Research Report Compliance

DOWN suspension systems manufactured by USG Interiors, Inc. comply with one or more of the following L.A. Research Report numbers: 22179, 23541, 24095.

For further information...

Customer Relations Centers

1-800-950-3839

USG Interiors, Inc. Area Sales Offices

South Pacific
500 North State College Blvd.
Suite 230
Orange, CA 92668
Office: (714) 978-0901
FAX: (714) 978-2579

Southwest
14643 Dallas Parkway
Suite 575, LB #78
Dallas, TX 75240
Office: (214) 490-0355
FAX: (214) 392-1505

Southeast
1000 Abernathy Road, N.E.
Suite 500
Atlanta, GA 30328
Office: (404) 396-9022
FAX: (404) 698-0769

Mid-Atlantic
1155 Connecticut Ave., N.W.
Washington, DC 20036
Office: (202) 467-8592
FAX: (202) 467-4924

Northeast
296 Temple Hill Road
Suite 100
New Windsor, NY 12553
Office: (914) 567-0059
FAX: (914) 567-0058

New York City
Office: (718) 937-7744
FAX: (914) 567-0058

Gulf Coast
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Suite 310
Orlando, FL 32822
Office: (407) 851-9485
FAX: (407) 851-4434

Great Lakes
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Westlake, OH 44145
Office: (800) 777-8744
FAX: (216) 892-7289

Chicago
1240 Iroquois Ave.
Suite 510
Naperville, IL 60563-8541
Office: (708) 355-7312
FAX: (708) 527-1841

Gateway
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Chicago, IL 60680-4470
125 South Franklin Street
Chicago, IL 60606-4678
Office: (312) 606-4000
FAX: (312) 606-5490

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Suite 499
Pleasanton, CA 94566
Office: (510) 460-8470
FAX: (510) 460-8474

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Office: (312) 822-3400

International Sales and Product Support

Australia
USG Interiors Australia (Pty.) Limited
Building 3, 203-215
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Australia
Office: 61-2725374
FAX: 61-27253331

Canada
CGC Interiors
735 Fourth Line
Oakville, Ontario
Canada L6L 5B7
Office: 1-800-387-7920
In Quebec, call 1-800-363-8844
FAX: 416-845-8819

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Donn France S.A. Z.I. Nord
Rue des Livraindieres
28100 Dreux
France
Office: 33-37385050
FAX: 33-37469233

Germany, Austria, Belgium, Greece, Luxembourg, The Netherlands, Switzerland
Donn Products GmbH
Postfach 110245, Metallstrasse 1
4060 Viersen II
Mackenstein, Germany
Office: 49-2161-9570
FAX: 49-2162-4461

Italy
Donn Italia S.P.R.L.
Via Dante 144
20090 Limoto-Tioltello
Milan, Italy
Office: 39-2-92699601
FAX: 39-2-92699605

Latin America/Caribbean
USG Interiors International, Inc.
8511 N.W. 61st Street
Miami, FL 33166
Office: 305-599-9707
FAX: 305-599-9940

Mexico
YESO Panamericano S.A. de C.V.
Providencia 334, 7th Floor
Col. del Valle
03100 Mexico, D.F.
Mexico
Office: 525-5437260
FAX: 525-6820876

Middle East/Africa
USG Interiors International, Inc.
125 South Franklin Street
P.O. Box 4470
Chicago, IL 60680-4470
Office: 312-606-5491
FAX: 312-606-5443

New Zealand
USG Interiors Pacific Ltd.
P.O. Box 11-155
6 Monier Place, Mt. Wellington
Ellerslie
Auckland, New Zealand
Office: 64-95795601
FAX: 64-95796859

Southeast Asia
USG Interiors Far East SDN BHD
43 & 45, 2nd Floor
Jalan SS 15/4
Subang Jaya
47500 Petaling Jaya
Selangor, Malaysia
Office: 60-37338980
FAX: 60-37344267

Spain
Donn Iberica
La Granja 60
28100 Alcobendas
Madrid, Spain
Office: 34-1-661-71-09
FAX: 31-1-661-71-08

Sweden, Norway, Denmark, Finland, Iceland, Russia
Donn Scandinavia
Box 7123
S-191 07 Sollentuna
Sweden
Office: 46-8-754-9360
FAX: 46-8-626-9451

United Kingdom/Ireland
Donn Products U.K. Ltd.
1 Swan Road
South West Industrial Estate
Peterlee
Co. Durham SR8 2JJ
England
Office: 44-9-1586-1121
FAX: 44-9-1586-0097

United States
USG Interiors International, Inc.
125 South Franklin Street
P.O. Box 4470
Chicago, IL 60680-4470
United States
Office: 312-606-5840
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Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

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Metric Specifications: USG Interiors, Inc. will provide metric conversions on its products and systems to help specifiers match metric design sizes. In addition, DX, AX, ZXA, CENTRICITEE and FINELINE products are available in metric dimensions from selected manufacturing plants. For suspension products, add "ME" before the standard item number to order the metric equivalent. Refer to *SA-100 Construction Selector* for additional information and a Table of Metric Equivalents.

Innovation within, value throughout.™

USG Interiors, Inc.
125 South Franklin Street
P.O. Box 4470
Chicago, Illinois 60680-4470

Ceiling Systems

S A 9 0 5

USG Interiors, Inc.



USG

Standard Colors for Ceiling Panels and Suspension Systems

Mist (053)



Sandstone (090)



Taupe (107)



Black (005)



Manila (246)



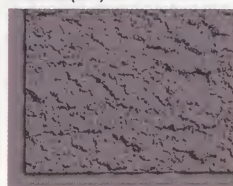
Straw (143)



Alabaster (104)



Charcoal (534)



Quartz (082)



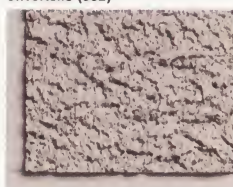
Beige (142)



Parchment (103)



Silvertone (052)



Seashell (535)



Nectar (546)



Mint (560)



Skyblue (561)



Dusk (191)



Cedar (562)



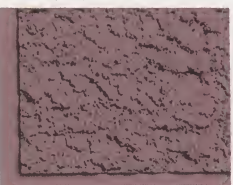
Teal (563)



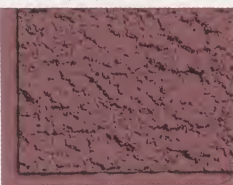
Blue Gray (564)



Sienna (565)



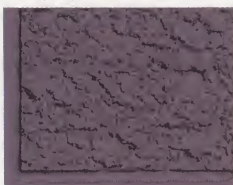
Redwood (566)



Spruce (567)



Slate (568)



USG Interiors features the widest selection of colors in the industry.

Call 1-800-950-3839
toll-free for color samples.
In Minnesota call
218-879-2800.

For technical information and/or information on ordering USG Interiors ceiling products, call 1-800-950-3839.

Contrasting Finishes for Suspension Systems

Eight contrasting finishes (not shown) are available as standard products for suspension systems. For swatches of these finishes, contact your USG Interiors representative.

Brass (065)
Bronze (033)
Chrome (066)
Silver Satin (002)
Tierra Brown (092)
Woodgrain (034)
White (004)
Flat White (050)

Color Uniformity:
Colors are checked by spectrophotometric analysis according to the "L.a.b." chromaticity coordinates system. Color-matching of coatings is within normally accepted commercial tolerance.

Substrate texture, room lighting and subjectivity of observer can affect perceived color of ceiling material. In any unbroken area of ceiling, all material should be used from the same product lot (indicated by lot number on each carton) to minimize the effect.

These color reproductions show colors that are as close as possible within printing limitations to actual products.

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Checkmate	12			•
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Chex/36	12			•
Chex/16	12			•
CLEAN ROOM	37	•		
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ECLIPSE	7		•	
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Fissured	29	•		
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1. Tile available in White plus selected colors.

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Most products are available with INTERSEPT® anti-microbial, a durable, surface-active ingredient that inhibits mold, mildew, and Gram-positive and Gram-negative bacteria.

X2000*, High-NRC X2000*, and X2000 PREMIER* Ceilings

- X2000: the smooth look that specifiers have been searching for
- High-NRC X2000: enhanced noise reduction
- X2000 PREMIER: 1" thick panel with superior noise reduction and sound attenuation ratings

X2000

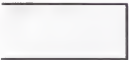
HIGH-NRC X2000

X2000 PREMIER

X2000 Panels/CENTRICITEE Suspension



Square (SQ)



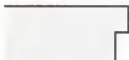
Shadowline Tapered (SLT)



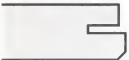
Interline Tapered (ILT)



Fineline (FL)



Bevel Edge/Kerf (BESK)



EnviroSense with Intercept

All products are available with Intercept. To specify, use the item number followed by the word "Intercept." For example, you would specify "76505 Intercept."

ASTM form/spec.

Type 3, Form 1 or 2, Class 25 Meets ASTM E1264

Flame spread/smoke developed
25/25

Light reflectance
LR-1

Weight
.90 lb./ft.² (Class A)
1.1 lb./ft.² (FIRECODE)
1.2 lb./ft.² (PREMIER)

Thermal resistance
R-2.5

Maximum backloading
.75 lb./ft.²

Maximum temperature
90°F

Maximum humidity
90% relative humidity

Water resistance

Less than 0.3g/m²/2 min. per Cobb test

Sag resistance

10-year warranty

Maintenance

Panels can be cleaned easily with a soft brush or vacuum

Cutouts for hardware

See description on page 6

Metric sizes

All products are available in metric sizes. To specify, add "ME" before the standard item number.

X2000 face-cuts

See pages 8 and 9

X2000 PREMIER face-cuts

All the face-cut patterns shown on pages 8-9 can be specified on X2000 PREMIER panels. For more information, contact your USG Interiors representative.

Colors

Panels: White, Manila, Silvertone, Parchment, Taupe, Mist. For additional colors, contact your USG Interiors representative.
Tile: White only.

Recommended suspensions

See page 47⁽¹⁾

Size	Edge ¹	Class A			FIRECODE		
		Item No.	NRC Range	CAC Range ²	Item No.	NRC Range	CAC Range ²

X2000

Panels

2'x2'x3/4"	SQ	76505	.65-.75	35-39	76509	.65-.75	35-39
2'x4'x3/4"	SQ	78505	.65-.75	35-39	N/A	—	—
4'x4'x1"	SQ	73400	.65-.75	35-39	N/A	—	—
2'x2'x3/4"	SLT	76705	.65-.75	35-39	76709	.65-.75	35-39
2'x4'x3/4"	SLT	78705	.65-.75	35-39	N/A	—	—
2'x2'x3/4"	ILT	76005	.65-.75	35-39	76009	.65-.75	35-39
2'x4'x3/4"	ILT	78005	.65-.75	35-39	N/A	—	—
2'x2'x3/4"	FL	76904	.65-.75	35-39	76909	.65-.75	35-39
2'x4'x3/4"	FL	78905	.65-.75	35-39	N/A	—	—

Tile

12"x12"x3/4"	BESK	70073	.65-.75	35-39	N/A	—	—
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High-NRC X2000

Panels

2'x2'x3/4"	SLT	76201	.70-.80	25-29	N/A	—	—
2'x2'x3/4"	ILT	76001	.70-.80	25-29	N/A	—	—
2'x2'x3/4"	FL	76301	.70-.80	25-29	N/A	—	—

X2000 PREMIER

Panels

2'x2'x1"	SQ	71405	.75-.85	40-44	N/A	—	—
2'x2'x1"	SLT	71805	.75-.85	40-44	N/A	—	—
2'x2'x1"	ILT	71005	.75-.85	40-44	N/A	—	—
2'x2'x1"	FL	71605	.75-.85	40-44	N/A	—	—

(1) For detail drawings of edges matched with recommended suspensions, see page 47.

(2) Ceiling Attenuation Class (CAC), previously indicated as Ceiling Sound Transmission Class (CSTC), when tested in accordance with ASTM E1414.

Face-Cut X2000* Ceilings

- X2000 Crystal: overlapping chiseled figures
- X2000 Sketch: woven scored lines
- X2000 Dots: small, evenly repeating dots
- X2000 Regiment: ultra-symmetrical miniature squares
- X2000 Square-to-Square: a window of tiny squares

CRYSTAL

SKETCH

SQUARE-TO-SQUARE

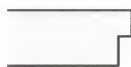
REGIMENT

DOTS

Shadowline Tapered (SLT)



Fineline (FL)



Envirosense with Intersept

All products are available with Intersept. To specify, use the item number followed by the word "Intersept." For example, you would specify "76730 Intersept."

ASTM form/spec.

Type 3, Form 1 or 2, Class 25
Meets ASTM E1264

Flame spread/smoke developed
25/25

Light reflectance
LR-1

Weight
.90 lb./ft.²

Thermal resistance
R-2.5

Maximum backloading
.75 lb./ft.²

Maximum temperature
90°F

Maximum humidity
90% relative humidity

Water resistance
Less than 0.3g/m²/2 min. per Cobb test

Sag resistance
10-year warranty

Maintenance
Panels can be cleaned easily with a soft brush or vacuum

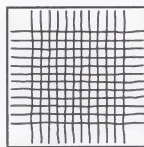
Metric sizes
All products are available in metric sizes. To specify, add "ME" before the standard item number.

Color
White

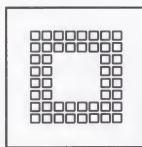
Recommended suspensions
See page 47⁽¹⁾



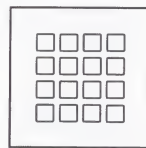
Crystal



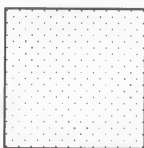
Sketch



Square-to-Square



Regiment



Dots

In addition to the face-cut patterns shown here, all the RENDITIONS patterns or custom-made patterns shown on page 11 can be specified with X2000 texture. For item numbers and/or more information, contact your USG Interiors representative.

*X2000 is a temporary name for this product. A permanent name will be selected by USG Interiors from names submitted by architect/designers in January 1994.

Class A					FIRECODE		
Size	Edge¹	Item No.	NRC Range	CAC Range²	Item No.	NRC Range	CAC Range²
X2000 Crystal							
Panels							
2'x2'x¾"	SLT	76730	.65-.75	35-39	N/A	—	—
2'x2'x¾"	FL	76930	.65-.75	35-39	N/A	—	—
X2000 Sketch							
Panels							
2'x2'x¾"	SLT	76750	.65-.75	35-39	N/A	—	—
2'x2'x¾"	FL	76950	.65-.75	35-39	N/A	—	—
X2000 Dots							
Panels							
2'x2'x¾"	SLT	76720	.65-.75	35-39	N/A	—	—
2'x2'x¾"	FL	76920	.65-.75	35-39	N/A	—	—
X2000 Regiment							
Panels							
2'x2'x¾"	SLT	76790	.65-.75	35-39	N/A	—	—
2'x2'x¾"	FL	76991	.65-.75	35-39	N/A	—	—
X2000 Square-to-Square							
Panels							
2'x2'x¾"	SLT	76760	.65-.75	35-39	N/A	—	—
2'x2'x¾"	FL	76960	.65-.75	35-39	N/A	—	—

(1) For detail drawings of edges matched with recommended suspensions, see page 47.

(2) Ceiling Attenuation Class (CAC), previously indicated as Ceiling Sound Transmission Class (CSTC), when tested in accordance with ASTM E1414.

**X2000 ILLUSION
Two-24**

**X2000 ILLUSION
Eight-12**

X2000 Chex/4

X2000 Chex/16

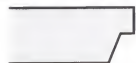
X2000 PEDESTALS I

X2000 PEDESTALS IV

Shadowline Tapered (SLT)



Interline Tapered (ILT)



Fineline (FL)



Pedestals (PE)



ILLUSION Two-24

Face-Cut X2000* Ceilings

- X2000 ILLUSION Two-24: the look of 2'x2' panels
- X2000 ILLUSION Eight-12: the look of 12"x12" tile
- X2000 Chex/4: classic 12"x12" squares
- X2000 Chex/16: 6"x6" squares, embellished with single reveal
- X2000 PEDESTALS I: triple-step scoring at the perimeter
- X2000 PEDESTALS IV: triple-step-cut 12"x12" modules



EnviroSense with Intersept

All products are available with Intersept. To specify, use the item number followed by the word "Intersept." For example, you would specify "78780 Intersept."

ASTM form/spec.

Type 3, Form 1 or 2, Class 25 Meets ASTM E1264

Flame spread/smoke developed

25/25

Light reflectance

LR-1

Weight

.90 lb./ft.²

Thermal resistance

R-2.5

Maximum backloading

.75 lb./ft.²

Maximum temperature

90°F

Maximum humidity

90% relative humidity

Water resistance

Less than 0.3g/m²/2 min. per Cobb test

Sag resistance

10-year warranty

Maintenance

Panels can be cleaned easily with a soft brush or vacuum

Cutouts for hardware

Cutouts are available to match standard edges. Openings can be 1" to 16" in diameter. Contact your USG Interiors representative for more information.

Metric sizes

All products are available in metric sizes. To specify, add "ME" before the standard item number.

Color

White

Recommended suspensions

See page 47⁽¹⁾



Illusion Two-24



Illusion Eight-12



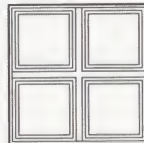
Chex/4



Chex/16



Pedestals I



Pedestals IV

Chex/4

PEDESTALS I

PEDESTALS IV

Size	Edge ¹	Class A			FIRECODE		
		Item No.	NRC Range	CAC Range ²	Item No.	NRC Range	CAC Range ²

X2000 ILLUSION Two-24

Panels

2'x4'x3/4"	SLT	78780	.65-.75	35-39	N/A	—	—
2'x4'x3/4"	ILT	78080	.65-.75	35-39	N/A	—	—

X2000 ILLUSIONS Eight-12

2'x4'x3/4"	SLT	78781	.65-.75	35-39	N/A	—	—
2'x4'x3/4"	ILT	78081	.65-.75	35-39	N/A	—	—

X2000 Chex/4⁽³⁾

Panels

2'x2'x3/4"	FL	76940	.65-.75	35-39	N/A	—	—
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X2000 Chex/16⁽³⁾

Panels

2'x2'x3/4"	FL	76900	.65-.75	35-39	N/A	—	—
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X2000 PEDESTALS I

Panels

2'x2'x3/4"	PE	72710	.65-.75	35-39	N/A	—	—
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X2000 PEDESTALS IV

2'x2'x3/4"	PE	72210	.65-.75	35-39	N/A	—	—
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(1) For detail drawings of edges matched with recommended suspensions, see page 47.

(2) Ceiling Attenuation Class (CAC), previously indicated as Ceiling Sound Transmission Class (CSTC), when tested in accordance with ASTM E1414.

(3) Face-cut is 3/4" in width.

ECLIPSE, High-NRC ECLIPSE, and ECLIPSE PREMIER Ceilings

- ECLIPSE: technologically advanced, nondirectional fine texture.
- High-NRC ECLIPSE: enhanced noise reduction
- ECLIPSE PREMIER: 1" thick panel with superior noise reduction and sound attenuation ratings.

ECLIPSE

HIGH-NRC ECLIPSE

ECLIPSE PREMIER

ECLIPSE Panels/CENTRICITEE Suspension



Square (SQ)



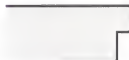
Shadowline Tapered (SLT)



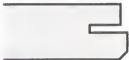
Interline Tapered (ILT)



Fineline (FL)



Bevel Edge/Kerf (BESK)



Envirosense with Intercept

All products are available with Intercept. To specify, use the item number followed by the word "Intercept." For example, you would specify "76575 Intercept."

ASTM form/spec.

Type 3, Form 1 or 2, Class 25
Meets ASTM E1264

Flame spread/smoke developed
25/25

Light reflectance
LR-1

Weight
.90 lb./ft.² (Class A)
1.1 lb./ft.² (FIRECODE)
1.2 lb./ft.² (PREMIER)

Thermal resistance
R-2.78

Maximum backloading
.75 lb./ft.²

Maximum temperature
90°F

Maximum humidity
90% relative humidity

Water resistance

Less than 0.3g/m²/2 min. per Cobb test

Sag resistance

10-year warranty

Maintenance

Panels can be cleaned easily with a soft brush or vacuum

Cutouts for hardware

See description on page 8

Metric sizes

All products are available in metric sizes. To specify, add "ME" before the standard item number.

ECLIPSE face-cuts

See pages 8 and 9

ECLIPSE PREMIER face-cuts

All the face-cut patterns shown on pages 8-9 can be specified on ECLIPSE PREMIER panels. For more information, contact your USG Interiors representative.

Colors

White, Manila, Silvertone, Parchment, Taupe, Mist (for additional colors, contact your USG Interiors representative). Tile available in White only.

Recommended suspensions

See page 47⁽¹⁾

		Class A			FIRECODE		
Size	Edge ¹	Item No.	NRC Range	CAC Range ²	Item No.	NRC Range	CAC Range ²
ECLIPSE							
Panels							
2'x2'x3/4"	SQ	76575	.65-.75	35-39	76579	.65-.75	35-39
2'x4'x3/4"	SQ	78575	.65-.75	35-39	N/A	—	—
4'x4'x1"	SQ	73470	.65-.75	35-39	N/A	—	—
2'x2'x3/4"	SLT	76775	.65-.75	35-39	76779	.65-.75	35-39
2'x4'x3/4"	SLT	78775	.65-.75	35-39	N/A	—	—
2'x2'x3/4"	ILT	76075	.65-.75	35-39	76079	.65-.75	35-39
2'x4'x3/4"	ILT	78075	.65-.75	35-39	N/A	—	—
2'x2'x3/4"	FL	76975	.65-.75	35-39	76979	.65-.75	35-39
2'x4'x3/4"	FL	78975	.65-.75	35-39	N/A	—	—
Tile							
12"x12"x3/4"	BESK	70073	.65-.75	35-39	N/A	—	—
High-NRC ECLIPSE							
Panels							
2'x2'x3/4"	SLT	76271	.70-.80	25-29	N/A	—	—
2'x2'x3/4"	ILT	76071	.70-.80	25-29	N/A	—	—
2'x2'x3/4"	FL	76371	.70-.80	25-29	N/A	—	—
ECLIPSE PREMIER							
Panels							
2'x2'x1"	SQ	71475	.70-.80	40-44	N/A	—	—
2'x2'x1"	SLT	71875	.70-.80	40-44	N/A	—	—
2'x2'x1"	ILT	71075	.70-.80	40-44	N/A	—	—
2'x2'x1"	FL	71675	.70-.80	40-44	N/A	—	—

(1) For detail drawings of edges matched with recommended suspensions, see page 47.

(2) Ceiling Attenuation Class (CAC), previously indicated as Ceiling Sound Transmission Class (CSTC), when tested in accordance with ASTM E1414.

ECLIPSE ILLUSION Two-24

ECLIPSE ILLUSION Eight-12

ECLIPSE Chex/4

ECLIPSE Chex/16

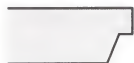
ECLIPSE PEDESTALS I

ECLIPSE PEDESTALS IV

Shadowline Tapered (SLT)



Interline Tapered (ILT)



Fineline (FL)



Pedestals (PE)



Face-Cut ECLIPSE Ceilings

- ECLIPSE ILLUSION Two-24: the look of 2'x2' panels
- ECLIPSE ILLUSION Eight-12: the look of 12"x12" tile
- ECLIPSE Chex/4: classic 12"x12" squares
- ECLIPSE Chex/16: 6"x6" squares, embellished with single reveal
- ECLIPSE PEDESTALS I: triple-step scoring at the perimeter
- ECLIPSE PEDESTALS IV: triple-step-cut 12"x12" modules



Envirosense with Intercept

All products are available with Intercept. To specify, use the item number followed by the word "Intercept." For example, you would specify "78785 Intercept."

ASTM form/spec.

Type 3, Form 1 or 2, Class 25 Meets ASTM E1264

Flame spread/smoke developed

25/25

Light reflectance

LR-1

Weight

.90 lb./ft.²

Thermal resistance

R-2.78

Maximum backloading

.75 lb./ft.²

Maximum temperature

90°F

Maximum humidity

90% relative humidity

Water resistance

Less than 0.3g/m²/2 min. per Cobb test

Sag resistance

10-year warranty

Maintenance

Panels can be cleaned easily with a soft brush or vacuum

Cutouts for hardware

Cutouts are available to match standard edges. Openings can be 1" to 16" in diameter. Contact your USG Interiors representative for more information.

Metric sizes

All products are available in metric sizes. To specify, add "ME" before the standard item number.

Color

White

Recommended suspensions

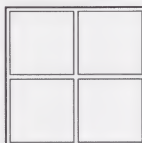
See page 47⁽¹⁾



Illusion Two-24



Illusion Eight-12



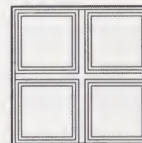
Chex/4



Chex/16



Pedestals I



Pedestals IV

Class A				FIRECODE		
Size	Edge ¹	Item No.	NRC Range	CAC Range ²	Item No.	NRC Range

ECLIPSE ILLUSION Two-24

Panels

2'x4'x3/4"	SLT	78785	.65-.75	35-39	N/A	—
2'x4'x3/4"	ILT	78085	.65-.75	35-39	N/A	—

ECLIPSE ILLUSIONS Eight-12

2'x4'x3/4"	SLT	78786	.65-.75	35-39	N/A	—
2'x4'x3/4"	ILT	78086	.65-.75	35-39	N/A	—

ECLIPSE Chex/4⁽³⁾

Panels

2'x2'x3/4"	FL	76945	.65-.75	35-39	N/A	—
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ECLIPSE Chex/16⁽³⁾

Panels

2'x2'x3/4"	FL	76905	.65-.75	35-39	N/A	—
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ECLIPSE PEDESTALS I

Panels

2'x2'x3/4"	PE	72015	.65-.75	35-39	N/A	—
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ECLIPSE PEDESTALS IV

2'x2'x3/4"	PE	72215	.65-.75	35-39	N/A	—
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(1) For detail drawings of edges matched with recommended suspensions, see page 47.

(2) Ceiling Attenuation Class (CAC), previously indicated as Ceiling Sound Transmission Class (CSTC), when tested in accordance with ASTM E1414.

(3) Face-cut is 3/16" in width.

ECLIPSE PEDESTALS I

Face-Cut ECLIPSE Ceilings

- ECLIPSE Crystal: overlapping chiseled figures
- ECLIPSE Sketch: woven scored lines
- ECLIPSE Dots: small, evenly repeating dots
- ECLIPSE Regiment: ultra-symmetrical miniature squares
- ECLIPSE Square-to-Square: a window of tiny squares

CRYSTAL

SKETCH

SQUARE-TO-SQUARE

REGIMENT

DOTS

Shadowline Tapered (SLT)



Fineline (FL)



Envirosense with Intersept

All products are available with Intersept. To specify, use the item number followed by the word "Intersept." For example, you would specify "76735 Intersept."

ASTM form/spec.

Type 3, Form 1 or 2, Class 25

Meets ASTM E1264

Flame spread/smoke developed
25/25

Light reflectance

LR-1

Weight

.90 lb./ft.²

Thermal resistance

R-2.78

Maximum backloading

.75 lb./ft.²

Maximum temperature

90°F

Maximum humidity

90% relative humidity

Water resistance

Less than 0.3g/m²/2 min. per Cobb test

Sag resistance

10-year warranty

Maintenance

Panels can be cleaned easily with a soft brush or vacuum

Metric sizes

All products are available in metric sizes. To specify, add "ME" before the standard item number.

Color

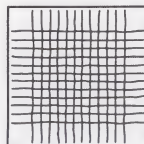
White

Recommended suspensions

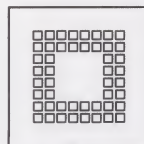
See page 47⁽¹⁾



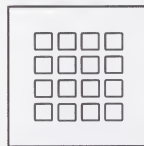
Crystal



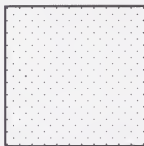
Sketch



Square-to-Square



Regiment



Dots

In addition to the face-cut patterns shown here, all the RENDITIONS patterns shown on page 11 can be specified with ECLIPSE texture. For item numbers and/or more information, contact your USG Interiors representative.

Class A					FIRECODE		
Size	Edge¹	Item No.	NRC Range	CAC Range²	Item No.	NRC Range	CAC Range²
ECLIPSE Crystal							
Panels							
2'x2'x¾"	SLT	76735	.65-.75	35-39	N/A	—	—
2'x2'x¾"	FL	76935	.65-.75	35-39	N/A	—	—
ECLIPSE Sketch							
Panels							
2'x2'x¾"	SLT	76755	.65-.75	35-39	N/A	—	—
2'x2'x¾"	FL	76955	.65-.75	35-39	N/A	—	—
ECLIPSE Dots							
Panels							
2'x2'x¾"	SLT	76725	.65-.75	35-39	N/A	—	—
2'x2'x¾"	FL	76925	.65-.75	35-39	N/A	—	—
ECLIPSE Regiment							
Panels							
2'x2'x¾"	SLT	76795	.65-.75	35-39	N/A	—	—
2'x2'x¾"	FL	76995	.65-.75	35-39	N/A	—	—
ECLIPSE Square-to-Square							
Panels							
2'x2'x¾"	SLT	76765	.65-.75	35-39	N/A	—	—
2'x2'x¾"	FL	76965	.65-.75	35-39	N/A	—	—

(1) For detail drawings of edges matched with recommended suspensions, see page 47.

(2) Ceiling Attenuation Class (CAC), previously indicated as Ceiling Sound Transmission Class (CSTC), when tested in accordance with ASTM E1414.

ORION Panels

ORION 210

ORION 220

ORION 230

ORION 270

STC ORION 270

Square (SQ)

Shadowline (SL)

Fineline (FL)

ORION 210

ORION 220

ORION 230

ORION 270



Envirosense with Intercept

ORION 270 products are available with Intercept. To specify, use the item number followed by the word "Intercept." For example, you would specify "68171 Intercept."

ASTM form/spec.

Type 3, Form 1 or 2, Class 25 Meets ASTM E1264

Flame spread/smoke developed

25/20 (ORION 210, 220, 230)

Light reflectance

LR-1

Weight

.60 lb./ft.² (1/2" panels)

.90 lb./ft.² (3/4" panels)

1.20 lb./ft.² (1" panels)

Thermal resistance

R-1.79 (1/2" panels)

R-2.78 (3/4" panels)

R-3.70 (1" panels)

Maximum backloading

.75 lb./ft.² (3/4" and 1" panels)

.25 lb./ft.² (1/2" panels)

Maximum temperature

95°F

Maximum humidity

95% relative humidity

Water resistance

Less than 0.3g/m²/2 min. per

Cobb test

Sag resistance

10-year warranty

Maintenance

Panels can be cleaned easily with a soft brush or vacuum

Metric sizes

All products are available in metric sizes. To specify, add "ME" before the standard item number.

Color

White

ORION 270 also available in Manila, Silvertone, Parchment, Taupe, Mist (square edge only)

Recommended suspensions

See page 47⁽¹⁾

Size	Edge ¹	Class A			FIRECODE		
		Item No.	NRC Range	CAC Range ²	Item No.	NRC Range	CAC Range ²

ORION 210

Panels

2'x2'x1/2"	SQ	62111	.70-.80	25-29	N/A	—	—
2'x2'x3/4"	SQ	N/A	—	—	66118	.70-.80	25-29
2'x4'x1/2"	SQ	64111	.70-.80	20-24	N/A	—	—
2'x4'x3/4"	SQ	68115	.70-.80	25-29	68118	.70-.80	25-29
20"x60"x3/4"	SQ	67511	.70-.80	20-24	N/A	—	—
4'x4'x1"	SQ	63411	.70-.80	20-24	N/A	—	—
2'x4'x1"	SQ	63171	.70-.80	20-24	N/A	—	—

ORION 210 Unperforated

Panels

2'x4'x1/2"	SQ	64112	N/A	N/A	N/A	—	—
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ORION 220 Unperforated

Panels

2'x4'x1/2"	SQ	64122	N/A	N/A	N/A	—	—
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ORION 220

Panels

2'x2'x1/2"	SQ	62121	.70-.80	20-24	N/A	—	—
2'x4'x3/4"	SQ	N/A	—	—	66128	.70-.80	25-29
2'x4'x1/2"	SQ	64121	.70-.80	20-24	N/A	—	—
2'x4'x3/4"	SQ	N/A	—	—	68128	.70-.80	25-29

ORION 230

Panels

2'x2'x1/2"	SQ	62131	.70-.80	20-24	N/A	—	—
2'x4'x3/4"	SQ	N/A	—	—	66138	.70-.80	25-29
2'x4'x1/2"	SQ	64131	.70-.80	20-24	N/A	—	—
2'x4'x3/4"	SQ	N/A	—	—	68138	.70-.80	25-29

ORION 270

Panels

2'x2'x3/4"	SQ	66171	.80-.90	25-29	66178	.70-.80	25-29
2'x4'x3/4"	SQ	68171	.80-.90	25-29	68178	.70-.80	25-29

2'x2'x1"	SQ	61171	.90-1.00	25-29	N/A	—	—
2'x4'x1"	SQ	63171	.90-1.00	25-29	N/A	—	—
2'x2'x3/4"	SL	66271	.80-.90	25-29	66278	.75-.85	25-29
2'x2'x1"	SL	61271	.85-.95	25-29	N/A	—	—
2'x2'x3/4"	FL	66371	.80-.90	25-29	66378	.75-.85	25-29
2'x2'x1"	FL	61371	.85-.95	25-29	N/A	—	—
4'x4'x1"	SQ	63471	.90-1.00	25-29	N/A	—	—

STC ORION 270

Panels

2'x2'x3/4"	SQ	66175	.75-.85	35-39	66179	.70-.80	35-39
2'x4'x3/4"	SQ	68175	.70-.80	35-39	N/A	—	—
2'x2'x1"	SQ	61175	.80-.90	35-39	N/A	—	—
2'x4'x1"	SQ	63175	.80-.90	35-39	N/A	—	—
2'x2'x3/4"	SL	66275	.70-.80	40-44	66279	.70-.80	35-39
2'x2'x1"	SL	61275	.75-.85	40-44	N/A	—	—
2'x2'x3/4"	FL	66375	.70-.80	40-44	66379	.70-.80	35-39
2'x2'x1"	FL	61375	.80-.90	40-44	N/A	—	—

(1) For detail drawings of edges matched with recommended suspensions, see page 47.

(2) Ceiling Attenuation Class (CAC), previously indicated as Ceiling Sound Transmission Class (CSTC), when tested in accordance with ASTM E1414.

ACOUSTONE Frost RENDITIONS Panels

- RENDITIONS I (A & B): refined beveled corners
- RENDITIONS II (A & B): contemporary square corner design created by non-intersecting etched lines
- RENDITIONS III (A & B): rounded corners punctuated by skip-scoring and concentric dots

Frost RENDITIONS

Fineline (FL)



Envirosense with Intercept

All products are available with Intercept. To specify, use the item number followed by the word "Intercept."

ASTM form/spec.

Type 3, Form 1, Class 25
Meets ASTM E1264

Flame spread/smoke developed

25/15

Light reflectance

LR-1 (White panels)

Weight

1.25 lb./ft.² (Class A)

1.30 lb./ft.² (FIRECODE)

Backing

Foil-backing

Thermal resistance

R-2.12

Maximum backloading

.75 lb./ft.²

Maintenance

Can be cleaned easily with a soft brush or vacuum

Durability

ACOUSTONE surface resists scrapes commonly caused by accessing ceiling panels

Metric sizes

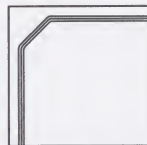
All products are available in metric sizes. To specify, add "ME" before the standard item number.

Colors

White plus 24 colors—exclusive clear-through color process masks nicks and scratches

Recommended suspensions

See page 47⁽¹⁾



RENDITIONS I (A)



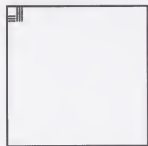
RENDITIONS II (A)



RENDITIONS III (A)



RENDITIONS I (B)



RENDITIONS II (B)



RENDITIONS III (B)



Straight Line

Size	Edge ¹	Class A			FIRECODE		
		Item No.	NRC Range	CAC Range ²	Item No.	NRC Range	CAC Range ²

Frost RENDITIONS I

Panels

2'x2'x3/4" (A) FL (3) .65-.75 40-44 N/A — —

2'x2'x3/4" (B) FL (3) .65-.75 40-44 N/A — —

Frost RENDITIONS II

Panels

2'x2'x3/4" (A) FL (3) .65-.75 40-44 N/A — —

2'x2'x3/4" (B) FL (3) .65-.75 40-44 N/A — —

Frost RENDITIONS III

Panels

2'x2'x3/4" (A) FL (3) .65-.75 40-44 N/A — —

2'x2'x3/4" (B) FL (3) .65-.75 40-44 N/A — —

Frost RENDITIONS Straight Line

Panels

2'x2'x3/4" FL (3) .65-.75 40-44 N/A — —

(1) For detail drawings of edges matched with recommended suspensions, see page 47.

(2) Ceiling Attenuation Class (CAC), previously indicated as Ceiling Sound Transmission Class (CSTC), when tested in accordance with ASTM E1414.

(3) For item numbers, contact your USG Interiors representative.

RENDITIONS I

RENDITIONS II

RENDITIONS III

11

PEDESTALS I and IV

Chex/36

Chex/4

Chex/16

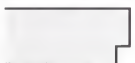
Checkmate

Checkline

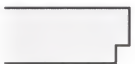
Pedestals Edge (PE)



Chex/4 and Chex/16 Edge



Checkmate and Checkline Edge



Chex 4/Glacier SL



Checkline

Chex/16

ACOUSTONE Scored Patterns

- PEDESTALS I and IV: triple step-cut 2'x2' and 12"x12" modules
- Chex/36: 4"x4" squares
- Chex/4: 12"x12" squares, available with GLACIER or Frost surface

- Chex/16: 6"x6" squares, embellished with single reveal
- Checkmate: ideal for expansive ceilings
- Checkline: linear scored



Envirosense with Intercept

All products are available with Intercept. To specify, use the item number followed by the word "Intercept." For example, you would specify "400 Intercept."

ASTM form/spec.

Type 3, Form 1, Class 25
Meets ASTM E1264

Flame spread/smoke developed

25/15
Light reflectance

LR-1 (White panels)
Weight

1.25 lb./ft.²
Backing

Foil-backing

Thermal resistance

R-2.12

Maximum backloading

.75 lb./ft.²

Maintenance

Can be cleaned easily with a soft brush or vacuum

Durability

ACOUSTONE surface resists scrapes commonly caused by accessing ceiling panels

Colors

White plus 24 colors—exclusive clear-through color process masks nicks and scratches

Metric sizes

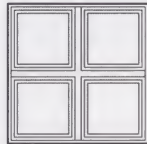
All products are available in metric sizes. To specify, add "ME" before the standard item number.

Recommended suspensions

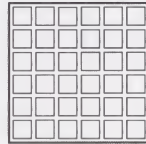
See page 47⁽¹⁾



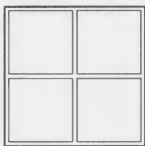
PEDESTALS I



PEDESTALS IV



Chex/36



Chex/4



Chex/16



Checkmate



Checkline

Size	Edge ¹	Class A			FIRECODE		
		Item No.	NRC Range	CAC Range ²	Item No.	NRC Range	CAC Range ²

PEDESTALS I

Panels

2'x2'x3/4"	Special	400	.60-.70	40-44	N/A	—	—
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PEDESTALS IV

Panels

2'x2'x3/4"	Special	404	.60-.70	40-44	N/A	—	—
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Chex/36

Panels

2'x2'x3/4"	Special	436	.70-.80	40-44	N/A	—	—
------------	---------	-----	---------	-------	-----	---	---

Chex/4

Panels—Frost Surface

2'x2'x3/4"	Special	448	.60-.70	40-44	N/A	—	—
------------	---------	-----	---------	-------	-----	---	---

Panels—GLACIER Surface

2'x2'x3/4"	SL	748	.70-.80	40-44	N/A	—	—
------------	----	-----	---------	-------	-----	---	---

Chex/16

Panels

2'x2'x3/4"	Special	416	.60-.70	40-44	N/A	—	—
------------	---------	-----	---------	-------	-----	---	---

Checkmate

Panels

2'x2'x3/4"	Special	432	.55-.65	40-44	N/A	—	—
------------	---------	-----	---------	-------	-----	---	---

Checkline

Panels

2'x2'x3/4"	Special	427	.55-.65	40-44	N/A	—	—
------------	---------	-----	---------	-------	-----	---	---

(1) For detail drawings of edges matched with recommended suspensions, see page 47.

(2) Ceiling Attenuation Class (CAC), previously indicated as Ceiling Sound Transmission Class (CSTC), when tested in accordance with ASTM E1414.

Chex/4—GLACIER Surface

Chex/4—Frost Surface

ACOUSTONE Fine Texture

- Frost: delicate surface texture, for a soft, light look.

Frost

Frost Panels/FINELINE Suspension



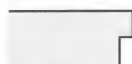
Square (SQ)



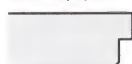
Shadowline (SL)



Fineline (FL)



Fineline (FL) Bevel



Oval (OV)



EnviroSense with Intercept

All products are available with Intercept. To specify use the item number followed by the word "Intercept." For example, you would specify "412 Intercept."

ASTM form/spec.

Type 3, Form 1, Class 25
Meets ASTM E1264

Flame spread/smoke developed
25/15

Light reflectance
LR-1 (White panels)

Weight
1.25 lb./ft.² (Class A)
1.30 lb./ft.² (FIRECODE)

Thermal resistance
R-2.12

Maximum backloading

.75 lb./ft.²

Maintenance

Can be cleaned easily with a soft brush or vacuum

Cutouts for hardware

See description on page 8

Durability

ACOUSTONE surface resists scrapes commonly caused by accessing ceiling panels

Metric sizes

All products are available in metric sizes. To specify, add "ME" before the standard item number.

Colors

White plus 24 colors—exclusive clear-through color process masks nicks and scratches

Recommended suspensions

See page 47⁽¹⁾

Class A					FIRECODE		
Size	Edge¹	Item No.	NRC Range	CAC Range²	Item No.	NRC Range	CAC Range²
Frost							
Panels							
2'x2'x¾"	SQ	412	.65-.75	35-39	413	.55-.65	35-39
2'x4'x¾"	SQ	455	.65-.75	35-39	N/A	—	—
2'x2'x¾"	SL Bevel	414	.65-.75	40-44	415	.55-.65	40-44
2'x4'x¾"	SL Bevel	450	.65-.75	40-44	N/A	—	—
2'x2'x¾"	FL	418	.65-.75	40-44	405	.55-.65	40-44
2'x4'x¾"	FL	460	.65-.75	40-44	N/A	—	—
2'x2'x¾"	FL	489	.65-.75	45-49³	N/A	—	—
2'x2'x¾"	FL Bevel	419	.65-.75	40-44	406	.55-.65	40-44
2'x2'x¾"	OV	425	.65-.75	40-44	N/A	—	—

(1) For detail drawings of edges matched with recommended suspensions, see page 47.

(2) Ceiling Attenuation Class (CAC), previously indicated as Ceiling Sound Transmission Class (CSTC), when tested in accordance with ASTM E1414.

(3) Must be used with FINELINE grid to achieve high CAC value.

ACOUSTONE Natural Texture

SANDRIFT

Moraine

Snowcap

LINEAR EXPRESSIONS

- SANDRIFT: richly etched, natural texture with a unique, tactile character.
- Moraine: random etched, medium-depth texture with irregular crosshatch pattern.

- Snowcap: medium and high peaks of texture in random pattern.
- LINEAR EXPRESSIONS: surfaces inspired by linear patterns in nature.

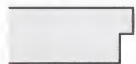
SANDRIFT Panels/CENTRICITEE Suspension



Shadowline (SL)



Fineline (FL)



Oval (OV)



Envirosense with Intercept
All products are available with Intercept. To specify, use the item number followed by the word "Intercept." For example, you would specify "808 Intercept."

ASTM form/spec.

Type 3, Form 1, Class 25
Meets ASTM E1264

Flame spread/smoke developed
25/15

Light reflectance
LR-1 (White panels)

Weight
1.25 lb./ft.² (Class A)
1.30 lb./ft.² (FIRECODE)

Backing
Foil-backing

Thermal resistance

R-2.12

Maximum backloading

.75 lb./ft.²

Maintenance

Can be cleaned easily with a soft brush or vacuum

Durability

ACOUSTONE surface resists scrapes commonly caused by accessing ceiling panels

Metric sizes

All products are available in metric sizes. To specify, add "ME" before the standard item number.

Colors

White plus 24 colors—exclusive clear-through color process masks nicks and scratches

Recommended suspensions

See page 47⁽¹⁾

		Class A			FIRECODE		
Size	Edge ¹	Item No.	NRC Range	CAC Range ²	Item No.	NRC Range	CAC Range ²
SANDRIFT							
Panels							
2'x2'x3/4"	SL	808	.65-.75	40-44	815	.55-.65	40-44
2'x2'x3/4"	FL	809	.65-.75	40-44	805	.55-.65	40-44
2'x2'x3/4"	OV	811	.65-.75	40-44	N/A	—	—
Moraine							
Panels							
2'x2'x3/4"	SL	840	.65-.75	40-44	N/A	—	—
2'x2'x3/4"	FL	841	.65-.75	40-44	N/A	—	—
2'x2'x3/4"	OV	842	.65-.75	40-44	N/A	—	—
Snowcap							
Panels							
2'x2'x3/4"	SL	820	.65-.75	40-44	N/A	—	—
2'x2'x3/4"	FL	821	.65-.75	40-44	N/A	—	—
2'x2'x3/4"	OV	822	.65-.75	40-44	N/A	—	—
LINEAR EXPRESSIONS Random							
Panels							
2'x2'x3/4"	SL	434	.60-.70	40-44	439	.55-.65	35-39
2'x2'x3/4"	FL	435	.60-.70	40-44	445	.55-.65	40-44
LINEAR EXPRESSIONS Wide							
Panels							
2'x2'x3/4"	SL	431	.55-.65	35-39	438	.55-.65	35-39
2'x2'x3/4"	FL	433	.55-.65	35-39	441	.55-.65	40-44

(1) For detail drawings of edges matched with recommended suspensions, see page 47.

(2) Ceiling Attenuation Class (CAC), previously indicated as Ceiling Sound Transmission Class (CSTC), when tested in accordance with ASTM E1414.

SANDRIFT

ACOUSTONE Snowcap Panels/ DOWN DX Suspension



LINEAR EXPRESSIONS Random Panels/CENTRICITEE Suspension

LINEAR
EXPRESSIONS
Random

Snowcap

Moraine

LINEAR
EXPRESSIONS
Wide

ACOUSTONE Medium Texture

- "F" Fissured: moderately planed, random fissures, for a natural-chiseled look.

"F" Fissured

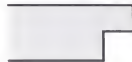
"F" Fissured Panels/CENTRICITEE Suspension



Square (SQ)



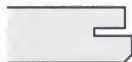
Shadowline (SL)



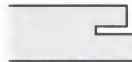
Fineline (FL)



Bevel Edge/Kerf (BESK)



Square Edge/Kerf (SESK)



Envirosense with Intercept

All products are available with Intercept. To specify, use the item number followed by the word "Intercept." For example, you would specify "131 Intercept."

ASTM form/spec.

Type 3, Form 1, Class 25
Meets ASTM E1264

Flame spread/smoke developed

25/15

Light reflectance

LR-1 (White panels and tile)

Weight

1.25 lb./ft.² (Class A)

1.30 lb./ft.² (FIRECODE)

Backing

Foil-backing (panels and FIRECODE tile)

Thermal resistance

R-2.12.

Maximum backloading

.75 lb./ft.²

Maintenance

Can be cleaned easily with a soft brush or vacuum

Durability

ACOUSTONE surface resists scrapes commonly caused by accessing ceiling panels

Metric sizes

All products are available in metric sizes. To specify, add "ME" before the standard item number.

Colors

White plus 24 colors—exclusive clear-through color process masks nicks and scratches

Recommended suspensions

See page 47⁽¹⁾

Size	Edge ²	Class A			FIRECODE		
		Item No.	NRC Range	CAC Range ³	Item No.	NRC Range	CAC Range ³

"F" Fissured

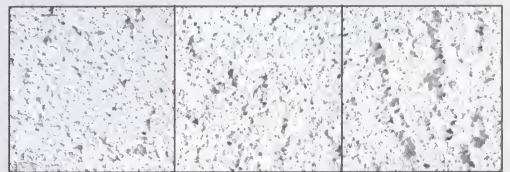
Panels

2'x2'x3/4"	SQ	131	.65-.75	35-39	140	.65-.75	35-39
2'x4'x3/4"	SQ	135	.65-.75	35-39	N/A	—	—
2'x2'x3/4"	SL	132	.65-.75	40-44	141	.65-.75	40-44
2'x4'x3/4"	SL	136	.65-.75	40-44	N/A	—	—
2'x2'x3/4"	FL	133	.65-.75	40-44	N/A	—	—

Tile^{4,5}

12"x12"x3/4"	SESK	101	.65-.75	30-34	138	.70-.80	35-39
12"x12"x3/4"	BESK	102	.65-.75	30-34	139	.70-.80	35-39

- (1) Tile available in White plus selected colors. See your USG Interiors representative for specific colors.
- (2) For detail drawings of edges matched with recommended suspensions, see page 47.
- (3) Ceiling Attenuation Class (CAC), previously indicated as Ceiling Sound Transmission Class (CSTC), when tested in accordance with ASTM E1414.
- (4) Only Class A tile can be adhesively applied.
- (5) Texture appearance will vary based on ceiling height and installation methods. See page 58.



Composite photo shows range to be expected in a production lot, and possibly in the same panel or tile. Ranges are random and cannot be specified.

ACOUSTONE Heavy Texture

- GLACIER: distinctive rough texture with rich surface detail.

GLACIER

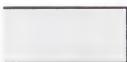
GLACIER Panels/FINELINE Suspension



Class A					FIRECODE		
Size	Edge ¹	Item No.	NRC Range	CAC Range ³	Item No.	NRC Range	CAC Range ³
GLACIER							
Panels							
2'x2'x $\frac{1}{4}$ "	SQ	706	.70-.80	35-39	714	.65-.75	35-39
2'x4'x $\frac{1}{4}$ "	SQ	764	.70-.80	35-39	N/A	—	—
2'x2'x $\frac{1}{4}$ "	SL	707	.70-.80	40-44	715	.70-.80	35-39
2'x4'x $\frac{1}{4}$ "	SL	711	.70-.80	40-44	N/A	—	—
2'x2'x $\frac{1}{4}$ "	FL	708	.70-.80	40-44	N/A	—	—
2'x2'x $\frac{1}{4}$ "	FL	789	.65-.75	45-49 ⁴	N/A	—	—
Tile ^{5,6}							
12"x12"x $\frac{1}{4}$ "	SESK	701	.70-.80	25-29	713	.75-.85	35-39

- (1) Tile available in White plus Earthtone colors only.
 (2) For detail drawings of edges matched with recommended suspensions, see page 47.
 (3) Ceiling Attenuation Class (CAC), previously indicated as Ceiling Sound Transmission Class (CSTC), when tested in accordance with ASTM E1414.
 (4) Must be used with FINELINE grid to achieve high CAC value.
 (5) Only Class A tile can be adhesively applied.
 (6) Texture appearance will vary based on ceiling height and installation methods. See page 58.

Square (SQ)



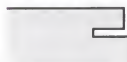
Shadowline (SL)



Fineline (FL)



Square Edge/Kerf (SESK)



Envirosense with Intercept
 All products are available with Intercept. To specify, use the item number followed by the word "Intercept." For example, you would specify "706 Intercept."
ASTM form/spec.
 Type 3, Form 1, Class 25
 Meets ASTM E1264
Flame spread/smoke developed
 25/15
Light reflectance
 LR-3 (White panels and tile)
Weight
 1.25 lb./ft.² (Class A)
 1.30 lb./ft.² (FIRECODE)
Backing
 Foil-backing (panels and FIRECODE tile)

Thermal resistance

R-2.12

Maximum backloading

.75 lb./ft.²

Maintenance

Can be cleaned easily with a soft brush or vacuum

Durability

ACOUSTONE surface resists scrapes commonly caused by accessing ceiling panels

Metric sizes

All products are available in metric sizes. To specify, add "ME" before the standard item number.

Colors

White plus 24 colors—exclusive clear-through color process masks nicks and scratches⁽¹⁾

Recommended suspensions

See page 47⁽²⁾



Artisan and Artisan II Colors

New variegated paint finishes give the freshest interpretation of color in the acoustical marketplace. Artisan II adds three-dimensional sculpted texture to variegated finish.

Artisan

Artisan II

Square (SQ)



Shadowline Tapered (SLT)



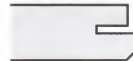
Interline Tapered (ILT)



Fineline (FL)



Bevel Edge/Kerf (BESK)



Envirosense with Intercept

All products are available with Intercept. To specify use the item number followed by the word "Intercept." For example, you would specify "4700 Intercept."

ASTM form/spec.

Type 3, Form 2, Class 25
Meets ASTM E1264

Flame spread/smoke developed

25/10

Weight

.81 lb./ft.² (Class A panels)
1.15 lb./ft.² (FIRECODE panels)

Thermal resistance

R-1.85

Maximum backloading

.75 lb./ft.²

Maintenance

Can be cleaned easily with a soft brush or vacuum

Plastic coating (optional)

Gardner-Scrubbability-tested to 3,000 cycles

Metric sizes

All products are available in metric sizes. To specify, add "ME" before the standard item number.

Colors

White, Mist, Beige, Black, Teal, Silvertone, Nectar, Dusk, Manila⁽¹⁾

Recommended suspensions

See page 47⁽²⁾

Class A					FIRECODE		
Size	Edge ²	Item No.	NRC Range	CAC Range ³	Item No.	NRC Range	CAC Range ³
Artisan Colors ¹							
Panels							
2'x2'x ³ / ₈ "	SQ	4700	.50-.60	35-39	N/A	—	—
2'x2'x ³ / ₈ "	SLT	4701	.50-.60	35-39	N/A	—	—
2'x2'x ³ / ₈ "	ILT	4702	.50-.60	35-39	N/A	—	—
2'x2'x ³ / ₈ "	FL	4703	.50-.60	35-39	N/A	—	—
Tile							
12"x12"x ³ / ₈ "	BESK	4704	.50-.60	35-39	N/A	—	—
Artisan II Colors ¹							
Panels							
2'x2'x ³ / ₈ "	SQ	4750	.50-.60	35-39	N/A	—	—
2'x2'x ³ / ₈ "	SLT	4751	.50-.60	35-39	N/A	—	—
2'x2'x ³ / ₈ "	ILT	4752	.50-.60	35-39	N/A	—	—
2'x2'x ³ / ₈ "	FL	4753	.50-.60	35-39	N/A	—	—
Tile							
12"x12"x ³ / ₈ "	BESK	4754	.50-.60	35-39	N/A	—	—

(1) To order, use the following color suffixes after the item number:

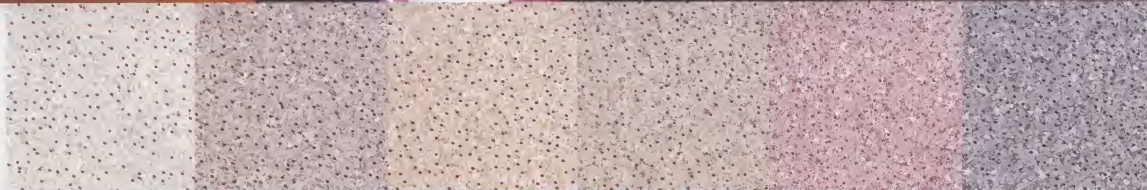
White (050-A)
Mist (053-A)
Beige (142-A)
Black (005-A)
Teal (563-A)
Silvertone (052-A)
Nectar (546-A)
Dusk (191-A)
Manila (246-A)

.60-.70 NRC is available on request.

FIRECODE panels are available on request.

(2) For detail drawings of edges matched with recommended suspensions, see page 47.

(3) Ceiling Attenuation Class (CAC), previously indicated as Ceiling Sound Transmission Class (CSTC), when tested in accordance with ASTM E1414.



White (050-A)

Mist (053-A)

Beige (142-A)

Manila (246-A)

Nectar (546-A)

Teal (563-A)



Silvertone (052-A)

Dusk (191-A)

Black (005-A)

PEDESTALS

I, II, IV, IX

PEDESTALS

Two/24

PEDESTALS

Four/48

PEDESTALS

Eight/12

Pedestals (PE)



AURATONE PEDESTALS Panels

- PEDESTALS I: triple step-cut detailing only at panel edges
- PEDESTALS II: narrow proportioned, triple step-cut 12"x24" modules
- PEDESTALS IV: triple step-cut 12"x12" modules
- PEDESTALS IX: smaller 8"x8" triple step-cut modules
- PEDESTALS ILLUSIONS Two/24: triple step-cut 2'x2' panel look with 2'x4' panel economy
- PEDESTALS ILLUSIONS Four/48: triple step-cut 6"x48" linear strips
- PEDESTALS ILLUSIONS Eight/12: triple step-cut 12"x12" tile look with 2'x4' panel economy



Envirosense with Intersept
All products are available with Intersept. To specify, use the item number followed by the word "Intersept." For example, you would specify "3670 Intersept."

ASTM form/spec.

Type 3, Form 2, Class 25
Meets ASTM E1264

Flame spread/smoke developed
25/10

Light reflectance
LR-1 (White panels)

Weight
1.00 lb./ft.²

Thermal resistance

Up to R-2.18

Maximum backloading

.75 lb./ft.²

Maintenance

Can be cleaned easily with a soft brush or vacuum

Plastic coating (optional)

Gardner-Scrubbability-tested to 3,000 cycles

Metric sizes

All products are available in metric sizes. To specify, add "ME" before the standard item number.

Colors

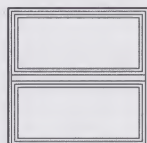
White, Manila, Silvertone, Parchment, Taupe, Mist⁽¹⁾

Recommended suspensions

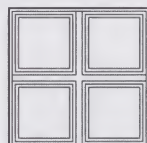
See page 47⁽²⁾



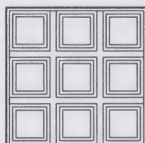
PEDESTALS I



PEDESTALS II



PEDESTALS IV



PEDESTALS IX



PEDESTALS Two/24



PEDESTALS Four/48



PEDESTALS Eight/12

Size	Edge ²	Class A			FIRECODE		
		Item No.	NRC Range	CAC Range ³	Item No.	NRC Range	CAC Range ³

PEDESTALS I

Panels

2'x2'x3/4"	PE	3670	(2)	40-44	N/A	—	—
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PEDESTALS II

Panels

2'x2'x3/4"	PE	3672	(2)	40-44	N/A	—	—
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PEDESTALS IV

Panels

2'x2'x3/4"	PE	3674	(2)	40-44	N/A	—	—
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PEDESTALS IX

Panels

2'x2'x3/4"	PE	3679	(2)	40-44	N/A	—	—
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PEDESTALS ILLUSIONS Two/24

Panels

2'x4'x3/4"	PE	4670	(2)	40-44	N/A	—	—
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PEDESTALS ILLUSIONS Four/48

Panels

2'x4'x3/4"	PE	4672	(2)	40-44	N/A	—	—
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PEDESTALS ILLUSIONS Eight/12

Panels

2'x4'x3/4"	PE	4674	(2)	40-44	N/A	—	—
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- (1) See your USG Interiors representative for availability of specific colors.
- (2) For detail drawings of edges matched with recommended suspensions, see page 47.
- (3) Ceiling Attenuation Class (CAC), previously indicated as Ceiling Sound Transmission Class (CSTC), when tested in accordance with ASTM E1414.

PEDESTALS I

AURATONE DESIGNER Ceiling Series

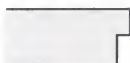
- DESIGNER SQUARES I: thirty-six 3"x3" squares
- DESIGNER SQUARES II: six 3"x24" linear bars
- DESIGNER SQUARES III: twenty-five 4"x4" squares
- DESIGNER SQUARES IV: eleven 1"x24" linear bars

DESIGNER SQUARES

Shadowline (SL)



Fineline (FL)



EnviroSense with Intercept

All products are available with Intercept. To specify, use the item number followed by the word "Intercept." For example, you would specify "56853 Intercept." **ASTM form/spec.**

Type 3, Form 2, Class 25

Meets ASTM E1264

Flame spread/smoke developed
25/10

Light reflectance
LR-1 (White panels)

Thermal resistance

Up to R-1.52

Maximum backloading
.75 lb./ft.²

Maintenance
Can be cleaned easily with a soft brush or vacuum

Plastic coating (optional)
Gardner-Scrubbability-tested to 3,000 cycles

Metric sizes
All products are available in metric sizes. To specify, add "ME" before the standard item number.

Colors
White, Manila, Silvertone, Parchment, Taupe, Mist⁽¹⁾

Recommended suspensions
See page 47⁽²⁾

			Class A			FIRECODE*		
Size	Edge²	Texture	Item No.	NRC Range	CSTC Range³	Item No.	NRC Range	CSTC Range³
DESIGNERS SQUARES I								
Panels								
2'x2'x¾"	SL 1⁄16" routing	Natural Fissured II	56853	.55-.65	35-39	5662	.55-.65	35-39
2'x2'x¾"	FL 1⁄16" routing	Natural Fissured II	56953	.55-.65	35-39	5663	.55-.65	35-39
DESIGNER SQUARES II								
Panels								
2'x2'x¾"	SL 1⁄16" routing	Natural Fissured II	56851	.50-.60	40-44	5664	.50-.60	40-44
	FL 1⁄16" routing	Natural Fissured II	56951	.50-.60	40-44	5665	.50-.60	40-44
DESIGNER SQUARES III								
Panels								
2'x2'x¾"	SL 1⁄16" routing	Natural Fissured II	56854	.55-.65	35-39	5666	.55-.65	40-44
	FL 1⁄16" routing	Natural Fissured II	56954	.55-.65	35-39	5667	.55-.65	40-44
DESIGNER SQUARES IV								
Panels								
2'x2'x¾"	SL 1⁄16" routing	Natural Fissured II	56855	.50-.60	40-44	5668	.50-.60	35-39
	FL 1⁄16" routing	Natural Fissured II	56955	.50-.60	40-44	5669	.50-.60	35-39

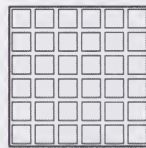
(1) See your USG Interiors representative for availability of specific colors.

(2) For detail drawings of edges matched with recommended suspensions, see page 47.

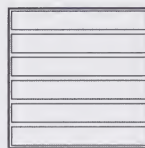
(3) Ceiling Attenuation Class (CAC), previously indicated as Ceiling Sound Transmission Class (CSTC), when tested in accordance with ASTM E1414.

* FIRECODE panels for Designer Squares are 1/2" thick.

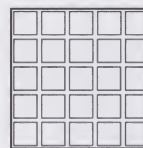
DESIGNER SQUARES I



DESIGNER SQUARES I



DESIGNER SQUARES II



DESIGNER SQUARES III



DESIGNER SQUARES IV

DESIGNER SQUARES IV

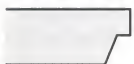
PROFILE
Nine Two/24

PROFILE
Sixteen/6

PROFILE
Eighty-one/2

PROFILE
Sixty-four/3

Interline Tapered (ILT)



AURATONE PROFILE Series

- PROFILE Nine Two/24: nine linear bars, 24" long and 2" wide
- PROFILE Sixteen/6: $\frac{9}{16}$ " face cuts create four quadrants; each quadrant is cross-scored with $\frac{1}{4}$ " cuts into 6"x6" squares

- PROFILE Sixty-four/3: $\frac{9}{16}$ " face cuts create four quadrants; each quadrant is cross-scored with $\frac{1}{4}$ " cuts into 3"x3" squares
- PROFILE Eighty-one/2: 2"x2" squares in a $\frac{9}{16}$ " routing



Envirosense Consortium

Envirosense with Intersept

All products are available with Intersept. To specify, use the item number followed by the word "Intersept." For example, you would specify "5024 Intersept."

ASTM form/spec.

Type 3, Form 2, Class 25
Meets ASTM E1264

Flame spread/smoke developed
25/10

Light reflectance
LR-1 (White panels)

Weight
.69-.81 lb./ft.²

Thermal resistance
R-1.52 to R-1.85

Maximum backloading
.75 lb./ft.²

Maintenance

Can be cleaned easily with a soft brush or vacuum

Plastic coating (optional)

Gardner-Scrubbability-tested to 3,000 cycles

Metric sizes

All products are available in metric sizes. To specify, add "ME" before the standard item number.

Colors

White, Manila, Silvertone, Parchment, Taupe, Mist⁽¹⁾

Recommended suspensions
See page 47⁽²⁾

PROFILE Sixty-Four/3 Panels/CENTRICITEE Suspensions

Size	Edge ¹	Class A			FIRECODE		
		Item No.	NRC Range	CAC Range ³	Item No.	NRC Range	CAC Range ³

PROFILE Nine Two/24

Panels

2'x2'x $\frac{9}{16}$ "	ILT	5024	.30-.40	35-39	N/A	—	—
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PROFILE Sixteen/6

Panels

2'x2'x $\frac{9}{16}$ "	ILT	5025	.30-.40	35-39	N/A	—	—
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PROFILE Sixty-four/3

Panels

2'x2'x $\frac{9}{16}$ "	ILT	5028	.30-.40	35-39	N/A	—	—
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PROFILE Eighty-one/2

Panels

2'x2'x $\frac{9}{16}$ "	ILT	5026	.30-.40	35-39	N/A	—	—
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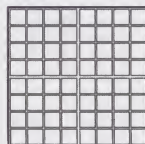
- (1) See your USG Interiors representative for availability of specific colors.
- (2) For detail drawings of edges matched with recommended suspensions, see page 47.
- (3) Ceiling Attenuation Class (CAC), previously indicated as Ceiling Sound Transmission Class (CSTC), when tested in accordance with ASTM E1414.



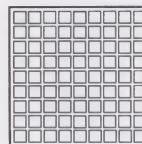
PROFILE Nine Two/24



PROFILE Sixteen/6



PROFILE Sixty-four/3



PROFILE Eighty-one/2

Sixty-Four/3

Eighty-One/2

Nine Two/24

Sixteen/6



AURATONE ILLUSION Ceiling Series

Two/24

Four/48

Eight/12

Thirty-two/6

Three/20

Shadowline Tapered (SLT)



Interline Tapered (ILT)



Envirosense with Intersept
All products are available with Intersept. To specify, use the item number followed by the word "Intersept." For example, you would specify "3575 Intersept."

ASTM form/spec.

Type 3, Form 2, Class 25

Meets ASTM E1264

Flame spread/smoke developed
25/10

Light reflectance

LR1 (White panels—Omni Fissured)

LR2 (White panels—Aspen surface)

Weight

1.37 lb./ft.²

Thermal resistance

R-2.18

Maximum backloading

.75 lb./ft.²

Maintenance

Can be cleaned easily with a soft brush or vacuum

Plastic coating (optional)

Gardner-Scrubbability-tested to 3,000 cycles

Metric sizes

All products are available in metric sizes. To specify, add "ME" before the standard item number.

Colors

White, Manila, Silvertone, Parchment, Taupe, Mist⁽¹⁾

Recommended suspensions

See page 47⁽²⁾

- Two/24: 2'x2' panel look with 2'x4' economy
- Four/48: 48"x6" linear strips
- Eight/12: the look of 12"x12" tile
- Thirty-two/6: the look of 6"x6" tile
- Three/20: the look of smaller 20"x20" panels

Size	Edge ²	Texture	Class A			FIRECODE		
			Item No.	NRC Range	CAC Range ³	Item No.	NRC Range	CAC Range ³
Two/24								
Panels								
2'x4'x3/4"	SLT 15/16" routing	Omni Fissured	3575	.55-.65	40-44	3472	.55-.65	40-44
2'x4'x3/4"	ILT 9/16" routing	Omni Fissured	3576	.55-.65	40-44	3084	.55-.65	40-44
2'x4'x3/4"	SLT 15/16" routing	Aspen	652	.55-.65	40-44	N/A	—	—
2'x4'x3/4"	ILT 9/16" routing	Aspen	6529	.55-.65	40-44	N/A	—	—
Four/48								
Panels								
2'x4'x3/4"	SLT 15/16" routing	Omni Fissured	3565	.55-.65	40-44	3465	.55-.65	40-44
2'x4'x3/4"	ILT 9/16" routing	Omni Fissured	3567	.55-.65	40-44	3085	.55-.65	40-44
2'x4'x3/4"	SLT 15/16" routing	Aspen	653	.55-.65	40-44	N/A	—	—
2'x4'x3/4"	ILT 9/16" routing	Aspen	6539	.55-.65	40-44	N/A	—	—
Eight/12								
Panels								
2'x4'x3/4"	SLT 15/16" routing	Omni Fissured	3570	.55-.65	40-44	3470	.50-.60	40-44
2'x4'x3/4"	ILT 9/16" routing	Omni Fissured	3571	.55-.65	40-44	3391	.55-.65	40-44
2'x4'x3/4"	SLT 15/16" routing	Aspen	654	.55-.65	40-44	N/A	—	—
2'x4'x3/4"	ILT 9/16" routing	Aspen	6549	.55-.65	40-44	N/A	—	—
Thirty-two/6								
Panels								
2'x4'x3/4"	SLT 15/16" routing	Omni Fissured	3578	.50-.60	40-44	3473	.50-.60	40-44
2'x4'x3/4"	ILT 9/16" routing	Omni Fissured	3577	.50-.60	40-44	3471	.55-.65	40-44
2'x4'x3/4"	SLT 15/16" routing	Aspen	656	.55-.65	40-44	N/A	—	—
2'x4'x3/4"	ILT 9/16" routing	Aspen	6569	.55-.65	40-44	N/A	—	—
Three/20								
Panels								
20"x60"x3/4"	SLT 15/16" routing	Omni Fissured	3580	.50-.60	40-44	N/A	—	—
20"x60"x3/4"	ILT 9/16" routing	Omni Fissured	3581	.50-.60	40-44	N/A	—	—

(1) See your USG Interiors representative for availability of specific colors.

(2) For detail drawings of edges matched with recommended suspensions, see page 47.

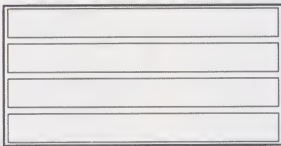
(3) Ceiling Attenuation Class (CAC), previously indicated as Ceiling Sound Transmission Class (CSTC), when tested in accordance with ASTM E1414.

Thirty-Two/6—Aspen Surface

ILLUSION Series Thirty-two/6 panels/CENTRICITEE Suspension



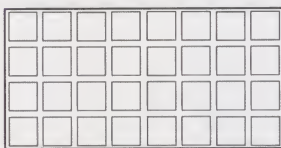
Two/24



Four/48



Eight/12



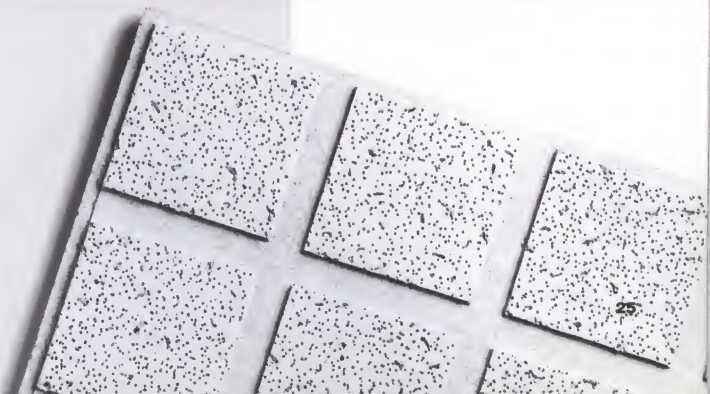
Thirty-two/6



Three/20



Thirty-Two/6—Omni Fissured Surface



AURATONE Design Texture

- Allegro: symmetrical, woven texture on a generous scale
- Calypso: soft, nonrepeating rivulets of texture with minute perforations

- Surf: shading and three-dimensional fissures

Allegro

Calypso

Surf

Calypso Panels/FINELINE Suspension

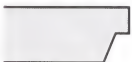
Square (SQ)



Shadowline Tapered (SLT)



Interline Tapered (ILT)



Fineline (FL)



Allegro



EnviroSense with Intercept

All products are available with Intercept. To specify, use the item number followed by the word "Intercept." For example, you would specify "4501 Intercept."

ASTM form/spec.

Type 3, Form 2, Class 25
Meets ASTM E1264

Flame spread/smoke developed

25/10

Light reflectance

LR1 (White panels—
Allegro and Calypso)
LR2 (Designer White panels—
Surf)

Weight

.81 lb./ft.² (Allegro, Calypso
and Surf Class A panels)

Thermal resistance

R-1.85

Maximum backloading

.75 lb./ft.²

Maintenance

Can be cleaned easily with a soft
brush or vacuum

Plastic coating (optional)

Gardner-Scrubability-tested to
3,000 cycles

Metric sizes

All products are available in metric
sizes. To specify, add "ME" before
the standard item number.

Colors

White plus 24 colors (Allegro and
Calypso)
Designer White (Surf)

Recommended suspensions

See page 47⁽¹⁾

Size	Edge ¹	Class A			FIRECODE		
		Item No.	NRC Range	CAC Range ²	Item No.	NRC Range	CAC Range ²

Allegro

Panels

2'x2'x ¹ / ₈ "	SQ	4501	.50-.60	35-39	N/A	—	—
2'x4'x ¹ / ₈ "	SQ	4500	.50-.60	35-39	N/A	—	—
2'x2'x ¹ / ₈ "	SLT	4505	.50-.60	35-39	N/A	—	—
2'x4'x ¹ / ₈ "	SLT	4506	.50-.60	35-39	N/A	—	—
2'x2'x ¹ / ₈ "	ILT	4507	.50-.60	35-39	N/A	—	—
2'x2'x ¹ / ₈ "	FL	4509	.50-.60	35-39	N/A	—	—

Calypso

Panels

2'x2'x ¹ / ₈ "	SQ	4601	.50-.60	35-39	N/A	—	—
2'x4'x ¹ / ₈ "	SQ	4600	.50-.60	35-39	N/A	—	—
2'x2'x ¹ / ₈ "	SLT	4605	.50-.60	35-39	N/A	—	—
2'x4'x ¹ / ₈ "	SLT	4606	.50-.60	35-39	N/A	—	—
2'x2'x ¹ / ₈ "	ILT	4607	.50-.60	35-39	N/A	—	—
2'x2'x ¹ / ₈ "	FL	4609	.50-.60	35-39	N/A	—	—

Surf

Designer White Panels

2'x2'x ¹ / ₈ "	SQ	5793	.55-.65	35-39	N/A	—	—
2'x4'x ¹ / ₈ "	SQ	5794	.55-.65	35-39	N/A	—	—
2'x2'x ¹ / ₈ "	SLT	5796	.55-.65	35-39	N/A	—	—
2'x4'x ¹ / ₈ "	SLT	5795	.55-.65	35-39	N/A	—	—

(1) For detail drawings of edges matched with recommended suspensions, see page 47.

(2) Ceiling Attenuation Class (CAC), previously indicated as Ceiling Sound Transmission Class (CSTC), when tested in accordance with ASTM E1414.

Calypso

Surf

AURATONE Natural Texture

- Aspen: random, naturally sculptured appearance
- Tahoe: naturally sculptured, softly rounded texture

- Olympia II: the most subtle of the designer surfaces, in perforated or unperforated styles; maximum temperature/humidity: 90°F, 90% R.H. on unperforated panels.

Aspen

Tahoe

Olympia II

Square (SQ)

Shadowline Tapered (SLT)

Fineline (FL)

Interline Tapered



Envirosense with Intercept

All products are available with Intercept. To specify, use the item number followed by the word "Intercept." For example, you would specify "650 Intercept."

ASTM form/spec.

Type 3, Form 2, Class 25
Meets ASTM E1264

Flame spread/smoke developed

25/10 (Aspen and Tahoe)
25/10 (Olympia II)

Light reflectance

LR1 (White panels—Aspen and Tahoe)
LR1 (Olympia II)

Weight

.81 lb./ft.² (Tahoe Class A panels)
1.00 lb./ft.² (Aspen Class A panels)
1.37 lb./ft.² (Aspen FIRECODE panels)
1.31 lb./ft.² (Olympia II Class A panels)
1.35 lb./ft.² (Olympia II FIRECODE panels)

Maximum temperature

90°F (Olympia II)

Maximum humidity

90% relative humidity (Olympia II)

Thermal resistance

Up to R-2.18

Maximum backloading

.75 lb./ft.²

Maintenance

Can be cleaned easily with a soft brush or vacuum

Plastic coating (optional)

Gardner-Scrubbability-tested to 3,000 cycles

Metric sizes

All products are available in metric sizes. To specify, add "ME" before the standard item number.

Colors

White plus 24 colors (Aspen and Tahoe)⁽¹⁾

White (Olympia II)

Recommended suspensions

See page 47⁽²⁾

Size	Edge ²	Class A			FIRECODE		
		Item No.	NRC Range	CAC Range ³	Item No.	NRC Range	CAC Range ³
Aspen							
Panels							
2'x2'x ³ / ₄ "	SLT	650	.55-.65	35-39	3845	.60-.70	35-39
2'x4'x ³ / ₄ "	SLT	651	.55-.65	35-39	3850	.60-.70	35-39
2'x2'x ³ / ₄ "	ILT	644	.55-.65	35-39	643	.60-.70	35-39
2'x2'x ³ / ₄ "	FL	649	.55-.65	35-39	N/A	—	—
Tahoe							
Panels							
2'x2'x ³ / ₄ "	SQ	632	.50-.60	35-39	N/A	—	—
2'x4'x ³ / ₄ "	SQ	633	.50-.60	35-39	N/A	—	—
2'x2'x ³ / ₄ "	SLT	5780	.50-.60	35-39	N/A	—	—
Olympia II							
Panels							
2'x2'x ³ / ₄ "	SQ	4911	.30-.40	40-44	4951	.30-.40	40-44
2'x4'x ³ / ₄ "	SQ	4913	.30-.40	40-44	4950	.30-.40	40-44
2'x2'x ³ / ₄ "	SLT	4910	.30-.40	40-44	4955	.30-.40	40-44
2'x2'x ³ / ₄ "	ILT	4912	.30-.40	40-44	4957	.30-.40	40-44
2'x2'x ³ / ₄ "	FL	N/A	.30-.40	40-44	4959	.30-.40	40-44
Perforated Panels ⁴							
2'x2'x ³ / ₄ "	SQ	N/A	—	—	4971	.50-.60	35-39
2'x4'x ³ / ₄ "	SQ	N/A	—	—	4970	.50-.60	35-39
2'x2'x ³ / ₄ "	SLT	N/A	—	—	4975	.50-.60	35-39
2'x2'x ³ / ₄ "	ILT	N/A	—	—	4977	.50-.60	35-39
2'x2'x ³ / ₄ "	FL	N/A	—	—	4979	.50-.60	35-39

(1) See your USG Interiors representative for availability of specific colors.

(2) For detail drawings of edges matched with recommended suspensions, see page 47.

(3) Ceiling Attenuation Class (CAC), previously indicated as Ceiling Sound Transmission Class (CSTC), when tested in accordance with ASTM E1414.

(4) For NRC and CAC data, see your USG Interiors representative.

Tahoe

Olympia II

Aspen

Omni Fissured

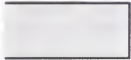
High-NRC Omni Fissured

High-STC Omni Fissured

Natural Fissured II

PREMIER Natural Fissured II

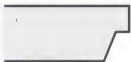
Square (SQ)



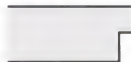
Shadowline Tapered (SLT)



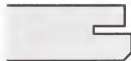
Interline Tapered (ILT)



Fineline (FL)



Bevel Edge/Kerf (BESK)



Tongue & Groove Flange (TGF)



Omni Fissured, High-NRC Omni Fissured



Envirosense with Intersept
All products are available with Intersept. To specify, use the item number followed by the word "Intersept." For example, you would specify "344 Intersept."

ASTM form/spec.

Type 3, Form 2, Class 25
Meets ASTM E1264

Flame spread/smoke developed

25/10 (Omni Fissured)
15/10 (Natural Fissured II)

Light reflectance

LR1

Weight

.69-.81 lb./ft.² (Class A 3/8" panels)

1.00 lb./ft.² (Class A and High-NRC

3/4" panels)

1.10 lb./ft.² (Class A 3/4" tile)

1.40 lb./ft.² (Class A 3/4" tile)

1.15 lb./ft.² (FIRECODE 3/8" panels and tile)

1.37 lb./ft.² (FIRECODE 3/4" panels)

1.40 lb./ft.² (FIRECODE 3/4" tile)

1.25 lb./ft.² (PREMIER FIRECODE 3/4" panels)

Thermal resistance

R-2.18 (3/8" products)

R-1.85 (3/4" products)

Maximum backloading

.75 lb./ft.²

Maintenance

Can be cleaned easily with a soft brush or vacuum

Plastic coating (optional)

Gardner-Scrubbability-tested to 3,000 cycles

Metric sizes

All products are available in metric sizes. To specify, add "ME"

before the standard item number.

Colors

White plus 24 colors (Omni Fissured)⁽¹⁾

White (Natural Fissured II)

Recommended suspensions

See page 47⁽²⁾

- Omni Fissured: lightly fissured, heavily perforated
- High-NRC Omni Fissured: excellent NRC's combined with optimum density

- High-STC Omni Fissured: excellent STC's for privacy in closed-plan
- Natural Fissured II: deeply fissured, moderately perforated
- PREMIER Natural Fissured II: excellent NRC's combined with optimum density

Size	Edge ²	Class A			FIRECODE		
		Item No.	NRC Range	CAC Range ³	Item No.	NRC Range	CAC Range ³

Omni Fissured

Panels

2'x2'x3/8"	SQ	344	.50-.60	35-39	338	.50-.60	40-44
2'x4'x3/8"	SQ	345	.50-.60	35-39	339	.50-.60	40-44
2'x4'x3/4"	SQ	343	.60-.70	40-44	3742	.55-.65	40-44
20"x60"x3/8"	SQ	334	.50-.60	35-39	454	.50-.60	40-44
30"x60"x3/8"	SQ	N/A	—	—	5688	.50-.60	40-44
30"x60"x3/4"	SQ	342	.60-.70	40-44	N/A	—	—
2'x5'x3/8"	SQ	346	.50-.60	35-39	N/A	—	—
2'x2'x3/8"	SLT	323	.50-.60	35-39	336	.50-.60	35-39
2'x2'x3/4"	SLT	341	.55-.65	35-39	3385	.50-.60	35-39
2'x4'x3/8"	SLT	330	.50-.60	35-39	337	.50-.60	35-39
2'x4'x3/4"	SLT	332	.55-.65	35-39	3334	.50-.60	35-39
20"x60"x3/8"	SLT	331	.50-.60	35-39	333	.50-.60	35-39
2'x2'x3/8"	ILT	5530	.50-.60	35-39	3386	.50-.60	35-39
2'x2'x3/8"	FL	5551	.50-.60	35-39	5751	.50-.60	35-39
2'x2'x3/4"	FL	3025	.55-.65	35-39	3392	.50-.60	35-39

Tile

12"x12"x3/8"	BESK	320	.50-.60	40-44	335	.55-.65	40-44
12"x12"x3/4"	BESK	340	.55-.65	45-49	N/A	—	—

Natural Fissured II

Panels

2'x2'x3/8"	SQ	56704	.50-.60	35-39	56766	.50-.60	35-39
2'x4'x3/8"	SQ	56705	.50-.60	35-39	56765	.50-.60	40-44
2'x2'x3/8"	SLT	52704	.50-.60	35-39	50704	.50-.60	35-39
2'x4'x3/8"	SLT	52705	.50-.60	35-39	50705	.55-.65	35-39
2'x2'x3/4"	ILT	55708	.50-.60	35-39	N/A	—	—

Tile

12"x12"x3/8"	BESK	50120	.55-.65	35-39	N/A	—	—
12"x12"x3/4"	TGF	50092	.55-.65	35-39	N/A	—	—

High-NRC Omni Fissured

Panels

2'x2'x3/8"	SQ	3173	.65-.75	35-39	N/A	—	—
2'x4'x3/8"	SQ	3178	.65-.75	35-39	N/A	—	—
2'x2'x3/4"	SLT	3148	.65-.75	35-39	N/A	—	—

High-STC Omni Fissured

Panels

2'x4'x3/8"	SQ	345STC	.50-.60	40-44	N/A	—	—
------------	----	--------	---------	-------	-----	---	---

PREMIER Natural Fissured II

Panels

2'x2'x3/8"	SLT	N/A	—	—	50832	.70-.80	35-39
2'x4'x3/8"	SQ	N/A	—	—	56836	.80-.90	35-39
20"x60"x3/8"	SQ	N/A	—	—	56835	.75-.85	35-39
2'x2'x3/4"	FL	N/A	—	—	3396	.70-.80	35-39

(1) See your USG Interiors representative for availability of specific colors.

(2) For detail drawings of edges matched with recommended suspensions, see page 47.

(3) Ceiling Attenuation Class (CAC), previously indicated as Ceiling Sound Transmission Class (CSTC), when tested in accordance with ASTM E1414.

Natural Fissured II, PREMIER Natural Fissured II

AURATONE Directional Fissured

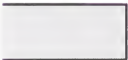
- Fissured: a subtle pattern of fissuring combined with random perforations

Fissured

Fissured Panels/FINELINE Suspension



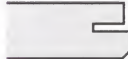
Square (SQ)



Shadowline Tapered (SLT)



Bevel Edge/Kerf (BESK)



Staple Flange (SF)



Envirosense with Intercept

All products are available with Intercept. To specify, use the item number followed by the word "Intercept." For example, you would specify "560 Intercept."

ASTM form/spec.

Type 3, Form 2, Class 25

Meets ASTM E1264

Flame spread/smoke developed
25/10

Light reflectance

LR1

Weight

.69-.81 lb./ft.² (Class A 1/8" panels)
1.00 lb./ft.² (Class A 1/4" panels)
1.10 lb./ft.² (Class A 1/2" tile)
1.40 lb./ft.² (Class A 3/4" tile)
1.15 lb./ft.² (FIRECODE 1/8" panels and tile)
1.37 lb./ft.² (FIRECODE 1/4" panels)
1.40 lb./ft.² (FIRECODE 1/2" tile)

Thermal resistance

R-2.18 (1/8" products)

R-1.85 (1/4" products)

Maximum backloading

.75 lb./ft.²

Maintenance

Can be cleaned easily with a soft brush or vacuum

Plastic coating (optional)

Gardner-Scrubbability-tested to 3,000 cycles

Metric sizes

All products are available in metric sizes. To specify, add "ME" before the standard item number.

Color

White

Recommended suspensions

See page 47⁽¹⁾

Class A					FIRECODE		
Size	Edge¹	Item No.	NRC Range	CAC Range²	Item No.	NRC Range	CAC Range²
Fissured							
Panels							
2'x2'x½"	SQ	560	.50-.60	35-39	585	.50-.60	35-39
2'x2'x¼"	SQ	359	.60-.70	35-39	387	.60-.70	35-39
2'x4'x½"	SQ	562	.50-.60	35-39	586	.55-.65	40-44
2'x4'x¼"	SQ	361	.60-.70	35-39	388	.60-.70	35-39
2'x2'x½"	SLT	506	.50-.60	35-39	517	.50-.60	35-39
2'x2'x¼"	SLT	312	.55-.65	35-39	386	.50-.60	35-39
2'x4'x½"	SLT	507	.50-.60	35-39	518	.50-.60	35-39
2'x4'x¼"	SLT	313	.55-.65	35-39	385	.55-.65	35-39
Tile							
12"x12"x⅛"	SF	500	.40-.50	N/A	N/A	—	—
12"x12"x¼"	BESK	504	.50-.60	40-44	515	.55-.65	45-49
12"x12"x½"	BESK	304	.60-.70	40-44	N/A	—	—

(1) For detail drawings of edges matched with recommended suspensions, see page 47.

(2) Ceiling Attenuation Class (CAC), previously indicated as Ceiling Sound Transmission Class (CSTC), when tested in accordance with ASTM E1414.

AURATONE Light Fissured

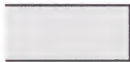
- Fine Fissured II: finest fissures and perforations

Fine Fissured II

Fine Fissured Panels/CENTRICITEE Suspension



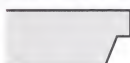
Square (SQ)



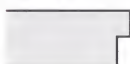
Shadowline Tapered (SLT)



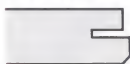
Interline Tapered (ILT)



Fineline (FL)



Bevel Edge/Kerf (BESK)



CR (SL)



CR (IL)



		Class A			FIRECODE		
		Item No.	NRC Range	CAC Range²	Item No.	NRC Range	CAC Range²
Size	Edge¹						
Fine Fissured II							
Panels							
2'x2'x3/4"	SQ	4721	.50-.60	40-44	4731	.55-.65	40-44
2'x4'x3/4"	SQ	4720	.50-.60	40-44	4730	.55-.65	40-44
2'x5'x3/4"	SQ	4727	.50-.60	35-39	4737	.55-.65	35-39
2'x2'x3/4"	SLT	4722	.55-.65	35-39	4732	.55-.65	35-39
2'x4'x3/4"	SLT	4723	.55-.65	35-39	4733	.55-.65	35-39
2'x2'x3/4"	CR (SL)	4712	.55-.65	35-39	N/A	—	—
2'x2'x3/4"	ILT	4728	.55-.65	35-39	4738	.55-.65	35-39
2'x2'x3/4"	CR (IL)	4710	.55-.65	35-39	N/A	—	—
2'x4'x3/4"	FL	4754	.55-.65	35-39	4794	.55-.65	35-39
Tile							
12"x12"x3/4"	Bevel Edge/Kerf	4726	.50-.60	40-44	4736	.50-.60	40-44

- (1) For detail drawings of edges matched with recommended suspensions, see page 47.
 (2) Ceiling Attenuation Class (CAC), previously indicated as Ceiling Sound Transmission Class (CSTC), when tested in accordance with ASTM E1414.



Envirosense with Intersept

All products are available with Intersept. To specify, use the item number followed by the word "Intersept." For example, you would specify "3621 Intersept."

ASTM form/spec.

Type 3, Form 2, Class 25
 Meets ASTM E1264

Flame spread/smoke developed

25/10

Light reflectance

LR1 (White panels and tile)

Weight

1.00 lb./ft.² (Class A panels)
 1.37 lb./ft.² (FIRECODE panels)
 1.40 lb./ft.² (tile)

Thermal resistance

Up to R-2.18

Maximum backloading

.75 lb./ft.²

Maintenance

Can be cleaned easily with a soft brush or vacuum

Plastic coating (optional)

Gardner-Scrubbability-tested to 3,000 cycles

Cutouts for hardware

Cutouts are available to match standard edges. Openings can be 1" to 16" in diameter. Contact your USG Interiors representative for more information.

Metric sizes

All products are available in metric sizes. To specify, add "ME" before the standard item number.

Colors

White plus 24 colors

Recommended suspensions

See page 47⁽¹⁾

Corona

Corona 90

Corona 90
ILLUSION Two/24

Corona 90
ILLUSION Four/48

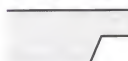
Corona 90
ILLUSION Eight/12

Corona 90 ILLUSION
Thirty-Two/6

Square (SQ)



Shadowline Tapered (SLT)



Interline Tapered (ILT)



Fineline (FL)



AURATONE Light Fissured

- Corona: clean, crisp, nondirectional fissures.
- Corona 90: same texture as Corona on panels that are suitable for high temperature and high humidity areas, including areas without services such as air conditioning.



EnviroSense with Intersept

All products are available with Intersept. To specify, use the item number followed by the word "Intersept." For example, you would specify "392 Intersept."

ASTM form/spec.

Type 3, Form 2, Class A
Meets ASTM E1264

Light reflectance

LR1

Thermal resistance

R-2.16 (Corona 90)

Maximum backloading

.75 lb./ft.²

Maximum Temperature

90°F (Corona 90)

Maximum Humidity

90% relative humidity (Corona 90)

Maintenance

Can be cleaned easily with a soft brush or vacuum

Plastic coating (optional)

Gardner-Scrubbability-tested to 3,000 cycles

Metric sizes

All products are available in metric sizes. To specify, add "ME" before the standard item number.

Color

White plus 24 colors

Recommended suspensions

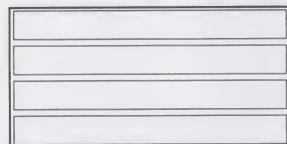
See page 47⁽¹⁾

Applications

Schools
Health centers
Shopping centers
Restroom areas
Commercial office space



Corona ILLUSION Two/23



Corona ILLUSION Four/48



Corona ILLUSION Eight/12



Corona ILLUSION Thirty-two/6

Size	Edge ¹	Class A			FIRECODE		
		Item No.	NRC Range	CAC Range ²	Item No.	NRC Range	CAC Range ²

Corona

Panels

2'x2'x $\frac{1}{8}$ "	SQ	392	.50-.60	35-39	397	.55-.65	40-44
2'x4'x $\frac{1}{8}$ "	SQ	391	.50-.60	35-39	398	.55-.65	40-44
2'x2'x $\frac{1}{8}$ "	SLT	352	.50-.60	35-39	355	.50-.60	35-39
2'x2'x $\frac{1}{8}$ "	ILT	353	.50-.60	35-39	373	.50-.60	35-39

Corona 90

Panels

2'x2'x $\frac{1}{8}$ "	SQ	992	.50-.60	35-39	962	.55-.65	40-44
2'x4'x $\frac{1}{8}$ "	SQ	990	.50-.60	35-39	960	.55-.65	40-44
2'x2'x $\frac{1}{8}$ "	SLT	922	.50-.60	35-39	N/A	—	—
2'x4'x $\frac{1}{8}$ "	SLT	923	.50-.60	35-39	N/A	—	—
2'x2'x $\frac{1}{8}$ "	ILT	932	.50-.60	35-39	N/A	—	—
2'x4'x $\frac{1}{8}$ "	ILT	934	.50-.60	35-39	N/A	—	—

Corona 90 ILLUSION Two/24

Panels

2'x4'x $\frac{1}{4}$ "	SLT	924	.55-.65	40-44	N/A	—	—
2'x4'x $\frac{1}{4}$ "	ILT	927	.55-.65	40-44	N/A	—	—

Corona 90 ILLUSION Four/48

Panels

2'x4'x $\frac{1}{4}$ "	SLT	948	.55-.65	40-44	N/A	—	—
2'x4'x $\frac{1}{4}$ "	ILT	947	.55-.65	40-44	N/A	—	—

Corona 90 ILLUSION Eight/12

Panels

2'x4'x $\frac{1}{4}$ "	SLT	912	.55-.65	40-44	N/A	—	—
2'x4'x $\frac{1}{4}$ "	ILT	914	.55-.65	40-44	N/A	—	—

Corona 90 ILLUSION Thirty-Two/6

Panels

2'x4'x $\frac{1}{4}$ "	SLT	926	.50-.60	40-44	N/A	—	—
2'x4'x $\frac{1}{4}$ "	ILT	946	.50-.60	40-44	N/A	—	—

(1) For detail drawings of edges matched with recommended suspensions, see page 47.

(2) Ceiling Attenuation Class (CAC), previously indicated as Ceiling Sound Transmission Class (CSTC), when tested in accordance with ASTM E1414.

AURATONE Perforated Ceilings

- Pin Perforated II Panels: random fine and coarse perforations
- Pin-Perforated Tile: random perforations

- Pebbled Panels and Tile: granular, perforated surface with improved sound ratings

Pin Perforated II

Pin-Perforated

Pebbled

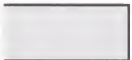
Pin-Perforated Tile/DX Concealed Suspension



Class A					FIRECODE		
Size	Edge¹	Item No.	NRC Range	CAC Range²	Item No.	NRC Range	CAC Range²
Pin-Perforated II							
Panels							
2'x2'x½"	SQ	462	.50-.60	35-39	472	.50-.60	40-44
2'x4'x½"	SQ	464	.50-.60	35-39	474	.50-.60	40-44
Pin-Perforated							
Tile							
12"x12"x½"	BESK	501	.50-.60	45-49	N/A	—	—
Pebbled							
Panels							
2'x2'x½"	SQ	4801	.50-.60	35-39	4851	.50-.60	40-44
2'x4'x½"	SQ	4800	.50-.60	35-39	4850	.50-.60	40-44
2'x2'x½"	SLT	4805	.50-.60	35-39	N/A	—	—
2'x4'x½"	SLT	4806	.50-.60	35-39	N/A	—	—
Tile							
12"x12"x½"	BESK	4811	.50-.60	40-44	N/A	—	—

- (1) For detail drawings of edges matched with recommended suspensions, see page 47.
 (2) Ceiling Attenuation Class (CAC), previously indicated as Ceiling Sound Transmission Class (CSTC), when tested in accordance with ASTM E1414.

Square (SQ)



Shadowline Tapered (SLT)



Bevel Edge/Kerf (BESK)



Envirosense with Intercept

All products are available with Intercept. To specify, use the item number followed by the word "Intercept." For example, you would specify "462 Intercept."

ASTM form/spec.

Type 3, Form 2, Class 25
Meets ASTM E1264

Flame spread/smoke developed
25/10

Light reflectance
LR1

Weight

.81 lb./ft.² (Class A panels)
1.15 lb./ft.² (FIRECODE panels)
.90 lb./ft.² (Class A tile)

Thermal resistance

R-1.85

Maximum backloading

.75 lb./ft.²

Maintenance

Can be cleaned easily with a soft brush or vacuum

Plastic coating (optional)

Gardner-Scrubbability-tested to 3,000 cycles

Metric sizes

All products are available in metric sizes. To specify, add "ME" before the standard item number.

Color

White

Recommended suspensions

See page 47⁽¹⁾

Pin-Perforated

Pin-Perforated II

Abuse Resistant

- **ROCK FACE PANELS:** hard core, specially compounded granular textured surface

- **IMPACTION System:** same surface texture as ROCK FACE panels; exceptionally resistant to breaking, cracking or falling out of the grid

ROCK FACE Panels

IMPACTION System

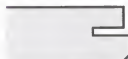
Square (SQ)



Shadowline Tapered (SLT)



Bevel Edge/Kerf (BESK)



Envirosense with Intercept

All products are available with Intercept. To specify, use the item number followed by the word "Intercept." For example, you would specify "56335 Intercept."

ASTM form/spec.

Type 3, Form 2, Class 25

Meets ASTM E1264

Flame spread/smoke developed

15/10 (ROCK FACE)

25/10 (IMPACTION)

Light reflectance

LR1

Weight

1.33 lb./ft.² (3/4" panels)

1.48 lb./ft.² (1 1/4" panels)

Thermal resistance

R-1.85 (3/4" panels)

R-2.18 (1 1/4" panels)

Maximum backloading

.75 lb./ft.²

Gardner Impact

Tested to 20"-25"/lb. without visible damage

Ball-hardness (ASTM C367)

Tested to 150 lb. for 1/4" depression by a 2" steel ball

Maintenance

Can be cleaned easily with a soft brush or vacuum

Plastic coating (optional)

Gardner-Scrubability-tested to 3,000 cycles

Metric sizes

All products are available in metric sizes. To specify, add "ME" before the standard item number.

Color

White

ROCK FACE Panel Retention Clips

Keep panels in place upon direct impact

IMPACTION Spring Assembly Clips

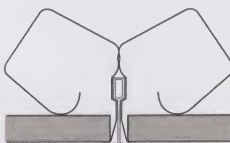
Keep panels in place upon direct impact; resist forces up to 1000 lbs. without breaking or dislodging panels

Recommended suspensions

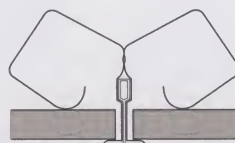
See page 47⁽¹⁾

Applications

Gymnasiums
Classrooms
Locker rooms
Corridors
Institutional settings



ROCK FACE Panel Retention Clip
(Item #20428)



IMPACTION Spring Assembly Clip
(Item #20429, U.S. Patent No. 3,834,106)

RETENTION and IMPACTION Clip require 1 1/2" high grid members.

Class A					FIRECODE		
Size	Edge¹	Item No.	NRC Range	CAC Range²	Item No.	NRC Range	CAC Range²
ROCK FACE Panels							
Panels							
2'x2'x¾"	SQ	N/A	—	—	56335	.40-.50	35-39
2'x2'x1¼"	SLT	N/A	—	—	55483	.50-.60	35-39
2'x4'x¾"	SQ	N/A	—	—	56380	.55-.65	35-39
Tile							
12"x12"x¾"	BESK	N/A	—	—	55385	.65-.75	40-44
IMPACTION System							
Panels							
2'x2'x¾"	SQ	N/A	—	—	56901	.60-.70	35-39

(1) For detail drawings of edges matched with recommended suspensions, see page 47.

(2) Ceiling Attenuation Class (CAC), previously indicated as Ceiling Sound Transmission Class (CSTC), when tested in accordance with ASTM E1414.

PREMIER Glass Fiber

- Nubby: woven fiberglass cloth facing
- Hi-LITE: washable vinyl film in two patterns, Twill and Kapok

Nubby

Hi-LITE

Nubby Panels/DX Suspension



Square

Shadowline

Fineline (FL)

ASTM form/spec.

Type 7, Form 2, Class 25
Meets ASTM E1264

Flame spread/smoke developed

25/10 (Nubby)
25/40 (Hi-LITE)

Light reflectance

LR1

Weight

.312 lb./ft.² (5/8" panels)
.375 lb./ft.² (3/4" panels)
.50 lb./ft.² (1" panels)
.75 lb./ft.² (1 1/2" panels)

Thermal resistance

R-2.5 (5/8" panels)
R-3 (3/4" panels)
R-4 (1" panels)
R-6 (1 1/2" panels)

Maximum temperature

95°F

Maximum humidity

95% relative humidity

Maximum backloading

.25 lb./ft.²

Maintenance

Nubby can be cleaned easily with a soft brush or vacuum
Hi-LITE can be cleaned easily with a damp sponge

Color

White

Metric sizes

All products are available in metric sizes. To specify, add "ME" before the standard item number.

Recommended suspensions

See page 47⁽¹⁾

Applications

Open plan offices
Waiting rooms
Nosi areas

Class A					Class A with Foil Backing		
Size	Edge¹	Item No.	NRC Range	CAC Range²	Item No.	NRC Range	CAC Range¹
PREMIER Nubby							
Panels							
2'x2'x3/8"	SQ	7000 G	.85-.95	N/A	7010 G	.80-.90	20-24
2'x4'x3/8"	SQ	7001 G	.85-.95	N/A	7011 G	.80-.90	20-24
2'x2'x1"	SQ	7002 G	.90-1.00	N/A	7012 G	.85-.95	25-29
2'x2'x1 1/2"	SQ	7006 G	.90-1.00	N/A	7015 G	.95-1.05	25-29
2'x4'x1"	SQ	7003 G	.90-1.00	N/A	7013 G	.85-.95	25-29
2'x4'x1 1/2"	SQ	7007 G	.90-1.00	N/A	7016 G	.95-1.05	25-29
4'x4'x1"	SQ	7004 G	.90-1.00	N/A	7014 G	.85-.95	25-29
4'x8'x1"	SQ	7005 G	.90-1.00	N/A	N/A	—	—

Class A					Class A Unperforated		
Size	Edge¹	Item No.	NRC Range	CAC Range²	Item No.	NRC Range	CAC Range²
PREMIER HI-LITE							
Twill Panels							
2'x2'x½"	SQ	7050 G	.65-.75	N/A	7052 G	.50-.60	N/A
2'x4'x½"	SQ	7051 G	.65-.75	N/A	7053 G	.50-.60	N/A
2'x2'x1"	SQ	7060 G	.80-.90	N/A	N/A	—	—
2'x4'x1"	SQ	7061 G	.80-.90	N/A	N/A	—	—
4'x4'x1"	SQ	7062 G	.80-.90	N/A	N/A	—	—
Kapok Panels							
2'x2'x¾"	SQ	7054 G	.70-.80	N/A	7056 G	.50-.60	N/A
2'x4'x¾"	SQ	7055 G	.70-.80	N/A	7057 G	.50-.60	N/A

(1) For detail drawings of edges matched with recommended suspensions, see page 47.

(2) Ceiling Attenuation Class (CAC), previously indicated as Ceiling Sound Transmission Class (CSTC), when tested in accordance with ASTM E1414.

PREMIER Hi-LITE Kapok

PREMIER Hi-LITE Twill

PREMIER Nubby

Gypsum Lay-In Panels

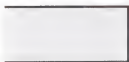
- White vinyl facing: embossed stipple pattern on 2-mil-thick vinyl
- Unfinished paper: natural color paper facing
- Painted Snowdrift: White paint finish
- CLEAN ROOM Vinyl: special vinyl finish

Gypsum Lay-In Panels

Gypsum Lay-In Panels/DXLA Suspension



Square (SQ)



ASTM form/spec.

Type 3, Form A, Class 3
Meets ASTM E1264

Flame spread/smoke developed

20/5 (stipple pattern and clean room vinyl facings)
10/0 (U.S. Coast Guard approved panels)

15/0 (paper facing)

Light reflectance

LR1 (white vinyl facing)

Weight

2.00 lb./ft.²

Thermal resistance

Up to R-0.45

Maximum backloading

.75 lb./ft.²

Maintenance

Can be cleaned easily with a damp sponge

USDA acceptance

Vinyl-faced stipple pattern panels approved for food processing areas

Metric sizes

All products are available in metric sizes. To specify, add "ME" before the standard item number.

Stipple Pattern Vinyl Colors

White, Silvertone, Manila

Recommended suspensions

See page 47⁽¹⁾

Indoor applications

Restaurants
Kitchens
Laboratories
Washrooms
Hospitals
Nursing homes

Protected outdoor applications

Covered entryways
Covered parking garages

Stipple Pattern

Class A					FIRECODE		
Size	Edge ¹	Item No.	NRC Range	CAC Range ²	Item No.	NRC Range	CAC Range ²
Stipple Pattern							
Panels							
2'x2'x1/2"	SQ	N/A	—	—	3260	N/A	45-49
2'x4'x1/2"	SQ	N/A	—	—	3270	N/A	45-49
Natural Color Paper							
Panels							
2'x2'x1/2"	SQ	N/A	—	—	3440	N/A	45-49
2'x4'x1/2"	SQ	N/A	—	—	3450	N/A	45-49
Painted Snowdrift White							
Panels							
2'x2'x1/2"	SQ	N/A	—	—	4000	N/A	45-49
2'x4'x1/2"	SQ	N/A	—	—	3380	N/A	45-49
CLEAN ROOM Vinyl							
Panels							
2'x4'x1/2"	SQ	N/A	—	—	3200	N/A	45-49

(1) For detail drawings of edges matched with recommended suspensions, see page 47.

(2) Ceiling Attenuation Class (CAC), previously indicated as Ceiling Sound Transmission Class (CSTC), when tested in accordance with ASTM E1414.

Painted Snowdrift



Environment Resistant

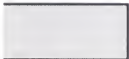
METAL FACE

SUPER-E

CERAMIC HERITAGE

FRP

Square (SQ)



METAL FACE (unperforated)



Envirosense with Intercept
SUPER-E and CERAMIC HERITAGE products are available with Intercept. To specify, use the item number followed by the word "Intercept." For example, you would specify "672 Intercept."

ASTM form/spec.

Type 3, Form 2, Class 25
Meets ASTM E1264

Flame spread/smoke developed

25/45 (METAL FACE)

25/10 (SUPER-E)

0/0 (CERAMIC HERITAGE)

Light reflectance

LR1

Weight

1.11 lb./ft.² (METAL FACE)

1.15 lb./ft.² (SUPER-E)

1.53 lb./ft.² (CERAMIC HERITAGE)

Thermal resistance

R-1.85 (METAL FACE and SUPER-E)

Maximum backloading

.75 lb./ft.² (METAL FACE and

CERAMIC HERITAGE)

3.50 lb./ft.² (SUPER-E)

Maintenance

Can be cleaned easily with a damp sponge

USDA acceptance

Unperforated panels approved for food processing areas (METAL FACE and SUPER-E)

U.S. Coast Guard acceptance

CERAMIC HERITAGE approved for use on merchant ships (no. 164,009/212/0)

Metric sizes

SUPER-E and CERAMIC HERITAGE products are available in metric sizes. To specify, add "ME" before the standard item number.

Color

White

Recommended suspensions

See page 47⁽¹⁾

Applications

Ceilings over swimming pools

Food preparation areas

Laboratories

Washrooms

Merchant ships (CERAMIC

HERITAGE)

- FRP: fiberglass-reinforced plastic ceiling/wall panels; USDA and FDA approved for use in food areas, resists odors, moisture, mold and mildew; resists chemicals per ASTM D-543; high impact strength and hardness; available in White, Almond, Beige and Gray

Class A					FIRECODE		
Size	Edge¹	Item No.	NRC Range	CAC Range²	Item No.	NRC Range	CAC Range²
METAL FACE (Perforated)							
Panels							
2'x2'x ³ / ₈ "	SQ	N/A	—	—	56092	.55-.65	40-44
2'x4'x ³ / ₈ "	SQ	N/A	—	—	56096	.55-.65	40-44
METAL FACE (Unperforated)							
Panels							
2'x2'x ³ / ₈ "	SQ	N/A	—	—	56093	.45-.55	40-44
2'x4'x ³ / ₈ "	SQ	N/A	—	—	56094	.45-.55	40-44
SUPER-E (Micro-Perforated)							
Panels							
2'x2'x ³ / ₈ "	SQ	N/A	—	—	672	.45-.55	40-44
2'x4'x ³ / ₈ "	SQ	N/A	—	—	675	.45-.55	40-44
SUPER-E (Unperforated)							
Panels							
2'x4'x ³ / ₈ "	SQ	N/A	—	—	5405	—	40-44
CERAMIC HERITAGE							
Panels							
2'x2'x ³ / ₈ "	SQ	N/A	—	—	56644	.35-.45	40-44
2'x4'x ³ / ₈ "	SQ	N/A	—	—	56645	.35-.45	40-44
FRP							
Panels							
2'x2'x ³ / ₈ "	SQ	N/A	—	—	*	.35-.45	40-44
2'x4'x ³ / ₈ "	SQ	N/A	—	—	*	.35-.45	40-44

*See your USG Interiors sales representative for item number.

(1) For detail drawings of edges matched with recommended suspensions, see page 47.

(2) Ceiling Attenuation Class (CAC), previously indicated as Ceiling Sound Transmission Class (CSTC), when tested in accordance with ASTM E1414.

SUPER-E

CERAMIC HERITAGE

Clean Room Ceilings

- CLEAN ROOM Class 100: impervious surface of white vinyl-coated aluminum foil
- CLEAN ROOM Class 10M-100M: perforated, white vinyl-coated, aluminum foil surface

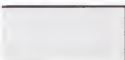
**CLEAN ROOM
Class 100**

**CLEAN ROOM
Class 10M-100M**

CLEAN ROOM Class 10M-100M Panels/ZXA Suspension



Square (SQ)



ASTM form/spec.

Type 3, Form 2, Class 25
Meets ASTM E1264

Flame spread/smoke developed
25/45

Light reflectance

LR1

Weight

1.11 lb./ft.²

Thermal resistance

R-1.85

Freeze-thaw resistance

Tested by 10 repeated cycles of 16 hours freezing (-30°F) and 8 hours thaw; no delamination occurred

Humidity resistance

Tested by 48 hour cycles of 90% and 25% relative humidity repeated continuously for 24 days; no delamination occurred

USDA acceptance

Clean Room Class 100 panels approved for food processing areas

Federal Standards

Meets Federal Standard 209D, "Clean Room and Work Station Requirements, Controlled Environment"

Maximum backloading

.75 lb./ft.²

Maintenance

Can be cleaned easily with a damp sponge

Plastic coating (face)

Gardner-Scrubbability-tested to 5,000 cycles

Plastic coating (edges and back)

Vinyl latex seal controls airborne particles

Metric sizes

All products are available in metric sizes. To specify, add "ME" before the standard item number.

Color

White

Recommended suspensions

See page 47⁽¹⁾

Applications

Hospitals
Computer rooms
Laboratories

CLEAN ROOM CLASS 10M-100M

Class A					FIRECODE		
Size	Edge¹	Item No.	NRC Range	CAC Range²	Item No.	NRC Range	CAC Range²
CLEAN ROOM Class 100							
Panels							
2'x2'x½"	SQ	N/A	—	—	56099	N/A	40-44
2'x4'x½"	SQ	N/A	—	—	56091	N/A	40-44
Clean Room Class 10M-100M							
Panels							
2'x2'x½"	SQ	N/A	—	—	56060	.55-.65	40-44
2'x4'x½"	SQ	N/A	—	—	56090	.55-.65	40-44

(1) For detail drawings of edges matched with recommended suspensions, see page 47.

(2) Ceiling Attenuation Class (CAC), previously indicated as Ceiling Sound Transmission Class (CSTC), when tested in accordance with ASTM E1414.

CLEAN ROOM Class 100

INTEGRATED CEILINGS Specialty Products

USG Interiors, Inc. offers the industry's most innovative resource of specialty ceiling designs. Developed for unique architectural settings, our specialty ceilings transform open ceiling planes into spectacular, artistic spaces. Complete ceiling systems come to the jobsite pre-engineered, fitted, painted and ready for assembly/installation.

COMPASSO

CADRE

QUADRA

TRANSPARENCIES



COMPASSO suspension trim provides unique designs for ceilings.

Cast-Gypsum Products CADRE reinforced gypsum panels and QUADRA ceiling coffers recreate the turn-of-the-century artistry of molded plaster and traditional wood ceilings. Timeless designs range from classic, simple coffers to ornate styles featuring intricately carved medallions. Both products offer the fireproof safety of gypsum and easy lay-in installation into standard DONN grids.

Dozens of options are available, including luminous skylights, elegant reflective surfaces, fabric-wrapped ceilings and walls and acoustical linear metal. Specialty materials include acrylic "glass block" panels and reinforced-gypsum panels. An assortment of specialty products is shown. For more information on these and additional specialty products, refer to SA-906, INTEGRATED CEILINGS Specialty Products, in Section 09500 of Sweet's Contract Interiors File or General Building and Renovation File. Or call 1-800-950-3839.

Suspension Trim COMPASSO suspension trim allows the creation of free-form ceiling islands or fascias incorporating standard DONN grid and ACOUSTONE or AURATONE panels in 2¼", 4" or 8" heights. COMPASSO trim promises all the benefits of acoustical suspension systems—sound control, accessibility and the use of lay-in fixtures not available with drywall soffits.



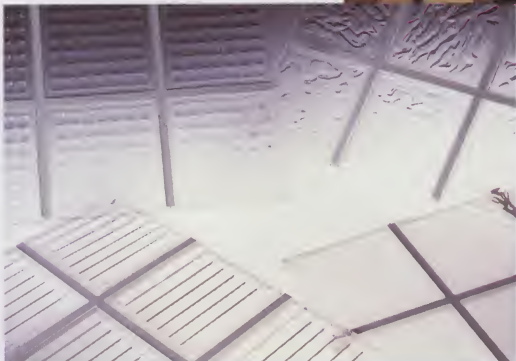
Custom CADRE Panels
in DONN DX Suspension.

Glass Block Ceilings TRANSPARENCIES panels give the same subtly refracted light play as traditional glass blocks, but with just a fraction of the weight, cost, and installation difficulties of glass. Lightweight, acrylic panels fit into a texturized DONN suspension system for easy lay-in installation.



White QUADRA ceiling coffers provide an unusual grid design for acoustical or cast-gypsum panels.

TRANSPARENCIES panels are lightweight enough to give glass-block look to ceilings. Four designs are available (clockwise from top left): TRANSPARENCIES 300, 400, 100 and 200.



INTEGRATED CEILINGS Specialty Products

Fabric-Covered Wall and Ceiling Panels

SILENT COLLECTION fabric-covered ceiling and wall panels, baffles and appliques provide effective sound control and cloth-covered beauty.

SILENT SQUARES® ceiling panels, in 2'x2' size, provide high NRC rating when combined with DONN suspension system.

SILENT EXPRESSIONS custom-embossed panels can express a subtle reference to a company image or a bold monogrammed statement. Four tasteful designs are also offered as standard patterns.

Beautiful SILENT wall panels install easily on existing masonry walls or gypsum drywall. Mineral fiber and glass substrate walls absorb sound. Complete line includes surface treatments (tackable, abuse-resistant), as well as various edge details.

SILENT SQUARES

SILENT EXPRESSIONS

SILENT Walls

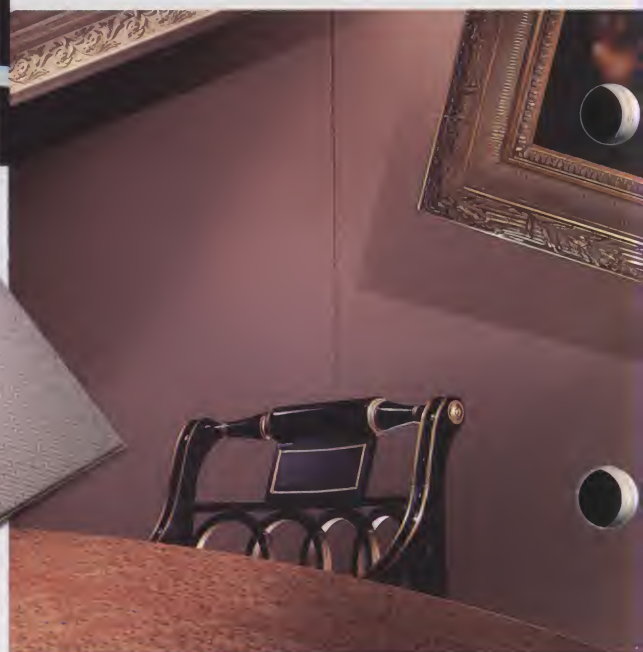


Good acoustics and beauty are combined in SILENT SQUARES ceiling.

Nine fabric lines and six vinyl styles in dozens of colors are available.



Four standard designs for SILENT EXPRESSIONS panels are available. From left, SILENT EXPRESSIONS I, II, III and IV.



INTEGRATED CEILINGS Specialty Products

Linear Metal Ceilings Two of USG Interiors' most popular metal ceiling designs are PARALINE ceilings and CELEBRATION panels. These products produce elegant, imaginative spaces with clean, crisp lines.

PARALINE ceilings are ideal for vast, expansive areas and can be curved to change

the dimensions of the ceiling plane. Systems are available for interiors as well as for exterior ceiling applications under protected soffits. UL-tested 2-hour and 3-hour fire ratings too.

Sophisticated CELEBRATION panels of natural metal or anodized aluminum snap into standard DONN FINELINE grid. Panels can be easily removed for fast access to the plenum.

CELEBRATION

PARALINE

SKYLITE



Above: Perforated-metal CELEBRATION ceiling presents an elegant graphic design with panels that seem to float within the reveal surrounding them.



Exciting linear metal ceiling designs can be easily accomplished with PARALINE ceilings.



Rectangular SKYLITE ceiling.

Luminous Ceilings USG Interiors has a wide assortment of luminous ceiling concepts. An example is SKYLITE ceilings, which offer the beauty of a natural skylight and provide the warmth and brightness of daylight. Lightweight extruded aluminum grid members can be formed into square, rectangular, triangular or round shapes. Light is typically provided from above by inexpensive fluorescent strip fixtures.

DX

DXL

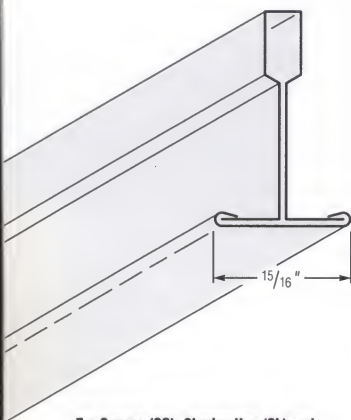
DXLA

DXW

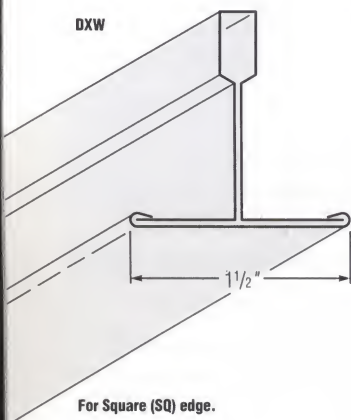
DX system: Class A, double web steel tee and cap. 32 standard finishes.

DXL system: Fire-rated, double web steel tee and cap. 32 standard finishes. More than 60 UL Designs up to 3 hours.

DXLA system: Fire-rated, double web steel tee and aluminum cap. 29 standard finishes. More than 60 UL Designs up to 3 hours.



For Square (SQ), Shadowline (SL) and Shadowline Tapered (SLT) edges.




For Square (SQ) edge.

Exposed Suspension Systems

DX, DXL, DXLA These systems are the most widely used acoustical suspension systems. They offer maximum economy, design simplicity and plenum access in a standard $15/16$ " exposed grid system.

Features

- High tensile steel connection clips on cross tee ends provide plug-in positive-lock insertion for quick installation
- Exceptional tension and compression connection values without additional wires, clips, fasteners or pins
- Cross tees with override ends resist twisting and give a professionally finished appearance
- Meets or exceeds all national code requirements, including seismic
- Proven corrosion-resistant coating

Item No.	Class	Length	Height	Tested Load (lbs./LF)			
				4' Hanger Spacing	5' Hanger Spacing	6' Hanger Spacing	
Main Tee							
DX 24	Intermediate	12'	1½"	12.4	6.1	3.6	
DX 26	Heavy Duty	12'	1½"	16.3	7.3	4.9	

Item No.	Length	Height	Tested Load (lbs./LF)
<i>Cross Tee</i>			
DX 216	2'	1"	17.1
DX 316	3'	1"	10.1
DX 416	4'	1"	5.0
DX 422	4'	1 1/2"	8.2
DX 522	5'	1 1/2"	4.3
DX 424	4'	1 1/2"	13.7
DX 524	5'	1 1/2"	6.4

Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360. For DXL/DXLA load data, see technical data offered by your USG Interiors representative.

Metric sizes

The above products are available in metric sizes. To order, add "ME" before the standard item number.

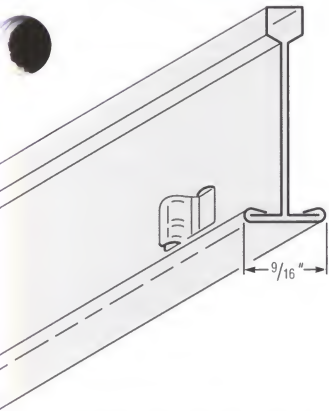
DXW The DXW system offers a $1 1/2$ " wide exposed face plus all the features of $15/16$ " DX grid. Available in Flat White.

Item No.	Class	Length	Height	Tested Load (lbs./LF)		
				4' Hanger Spacing	5' Hanger Spacing	6' Hanger Spacing
Main Tee						
DXW 26	Heavy Duty	12'	1½"	16.3	7.3	4.9
Item No.		Length	Height	Tested Load (lbs./LF)		
Cross Tee						
DXW 224		2'	1½"	65.0		
DXW 424		4'	1½"	13.7		
DXW 524		5'	1½"	6.4		

Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.



CENTRICITEE



For Square (SQ), Fineline (FL) and Interline Tapered (ILT) edge panels.

Narrow Suspension Systems

CENTRICITEE Presents a subtle, narrow-line alternative to $1\frac{5}{16}$ " exposed grid. Fire-rated assemblies available up to 2 hours.

Features

- Patented, automatic panel-centering devices built into each grid member
- Meets or exceeds all national code requirements, including seismic
- 29 standard finishes
- Available in Intermediate and Heavy Duty
- High tensile steel connection clips on cross tee ends provide plug-in positive-lock insertion for quick installation
- Exceptional tension and compression connection values without additional wires, clips, fasteners or pins
- Cross tees with override ends resist twisting and give a professionally finished appearance
- Proven corrosion-resistant coating

Item No.	Class	Length	Height	Tested Load (lbs./LF)	
				4' Hanger Spacing	5' Hanger Spacing
Main Tee					
DXT 24	Intermediate	12'	1½"	12.2	6.6
DXT 26	Heavy	12'	1½"	16.0	7.3
Item No.		Length	Height	Tested Load (lbs./LF)	
Cross Tee					
DXT 218		2'	1⅝"	21.2	
DXT 418		4'	1⅝"	5.0	
DXT 424		4'	1½"	12.2	
DXT 524		5'	1½"	6.7	

Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.

Metric sizes

The above products are available in metric sizes. To order, add "ME" before the standard item number.



CENTRICITEE Suspension/
ECLIPSE Panels

Narrow Suspension Systems

FINELINE An innovative, narrow-profile, slotted ceiling grid. Its mitered intersections offer a clean, tailored appearance. 1/4" center reveal.

Features

- High tensile steel connection clips on cross tee ends provide plug-in positive-lock insertion for quick installation

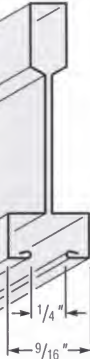
- Exceptional tension and compression connection values for seismic efficiency without additional wires, clips, fasteners or pins
- Choice of module sizes
- Fire-rated assemblies available
- Integrates with DONN air diffuser assemblies for a clean, uninterrupted ceiling plane

FINELINE

FINELINE system: Available in all white, white with black reveal, and 24 standard colors.

FINELINE With Inside Color system: Outside color of black or white with contrasting reveal of red, yellow, royal blue or turquoise. Effective use of bright color—perfect with black or white ceiling panels.

FINELINE

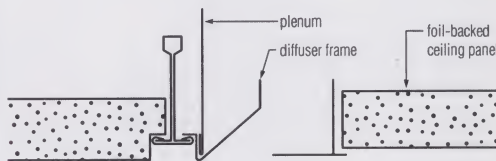
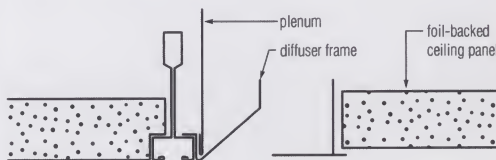


For Fineline (FL) edge panels.



DONN Air Diffuser

- Compatible with all USG Interiors 5/16" narrow suspension systems: CENTRICITEE, FINELINE, FINELINE 1/8, MERIDIAN, and Highline
- Available in 1, 2, 3, or 4-slot styles



FINELINE with Inside Color is available in five colors of reveal in black or white outside color.

				Tested Load (lbs./LF)		
Item No.	Class	Length	Height	4' Hanger Spacing	5' Hanger Spacing	6' Hanger Spacing
Main Tee						
DXF 29	Intermediate	12'	1 ²⁵ / ₃₂ "	12.3	6.6	3.6
DXFH 29	Heavy Duty	12'	1 ²⁵ / ₃₂ "	16.7	8.3	4.9
Item No.		Length	Height	Tested Load (lbs./LF)		
Cross Tee						
DXF 229		2'	1 ²⁵ / ₃₂ "	59.8		
DXF 429 N		4'	1 ²⁵ / ₃₂ "	13.5		
DXF 529 N		5'	1 ²⁵ / ₃₂ "	6.9		

Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.

Metric sizes

The above products are available in metric sizes. To order, add "ME" before the standard item number.



Narrow Suspension Systems

FINELINE 1/8 A narrow-profile, slotted grid similar to FINELINE grid, but with a 1/8" center reveal.

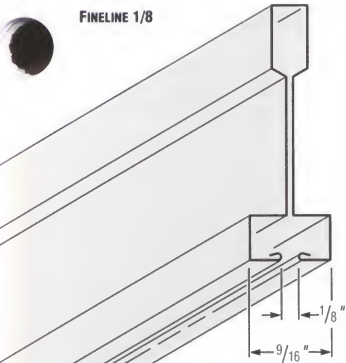
Features

- High tensile steel connection clips on cross tee ends provide plug-in positive-lock insertion for quick installation
- Exceptional tension and compression connection values for seismic efficiency without additional wires, clips, fasteners or pins

- Class A only
- Choice of module sizes: 2'x2', 2'x4', and 30"x30"
- Available in Flat White and 24 standard colors
- Integrates with DOWN air diffuser assemblies for a clean, uninterrupted ceiling plane

FINELINE 1/8

FINELINE 1/8



For Fineline (FL) edge panels.

ECLIPSE Panels/FINELINE 1/8 Suspension



				Tested Load (lbs./LF)		
Item No.	Class	Length	Height	4' Hanger	5' Hanger	6' Hanger
				Spacing	Spacing	Spacing
Main Tee						
DXFF 2924	Intermediate	12'	1 ²⁵ / ₃₂ "	12.3	6.6	3.6
DXFFH 2924	Heavy Duty	12'	1 ²⁵ / ₃₂ "	16.7	8.3	4.9
Item No.		Length	Height	Tested Load (lbs./LF)		
Cross Tee						
DXFF 229		2'	1 ²⁵ / ₃₂ "	59.8		
DXFF 429 N		4'	1 ²⁵ / ₃₂ "	13.5		

Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.

Metric sizes

The above products are available in metric sizes. To order, add "ME" before the standard item number.

Narrow Suspension Systems

MERIDIAN Combines the esthetics of more expensive screw-slot grid with the function and utility of exposed grid. Its unique, rounded $\frac{5}{32}$ " reveal softens the effect of grid lines to enhance the finished look.

Features

- Automatic centering of panels and light fixtures
- High tensile steel connection clips on cross tee ends provide plug-in positive-lock insertion for quick installation
- Exceptional tension and compression connection values for seismic efficiency without additional wires, clips, fasteners or pins
- 31 standard finishes
- Class A only

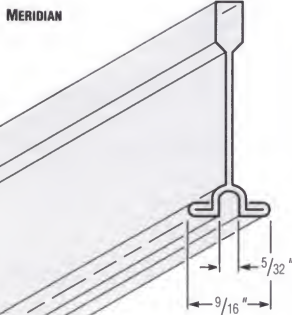
Highline A narrow-faced extruded aluminum screw-slot grid with crisp edge detail.

Features

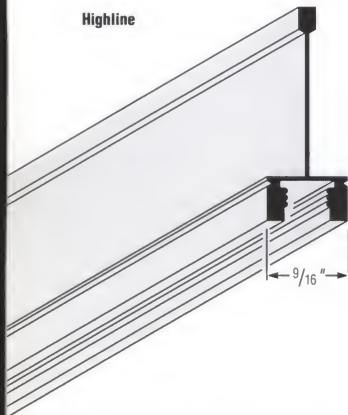
- Smooth, medium, and heavy textures available, including the option of a contrasting black reveal
- Provides an uninterrupted reveal for a trim, finished appearance
- Class A only
- For complete product information, contact your USG Interiors representative

MERIDIAN

Highline



Highline



For Square (SQ) and Fineline (FL) edge panels. ILT edge panel—MERIDIAN only.

Item No.	Class	Length	Height	Tested Load (lbs./LF)	
				4' Hanger Spacing	5' Hanger Spacing
Main Tee					
DXM 24	Intermediate	12'	1½"	12.4	6.5
Item No.		Length	Height	Tested Load (lbs./LF)	
Cross Tee					
DXM 224		2'	1½"	50.4	
DXM 424		4'	1½"	8.1	
DXM 524		5'	1½"	4.3	

Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.

Item No.	Class	Length	Height
----------	-------	--------	--------

Main Tee

HIC/HCC 3012N24	Intermediate	12'	1 1/2"
-----------------	--------------	-----	--------

HIC/HCC 3612N24	Heavy Duty	12'	2 1/4"
-----------------	------------	-----	--------

Item No.	Length	Height
----------	--------	--------

Cross Tee

HIC/HCC 2424	2'	1 1/2"
--------------	----	--------

HIC/HCC 4830	4'	1 1/4"
--------------	----	--------

HIC/HCC 4830N	4'	1 1/4"
---------------	----	--------



ORION 270 Panels/MERIDIAN Suspension.

Environmental Suspension Systems

ZXA, ZXLA Double web hot dipped galvanized steel tee, painted aluminum cap, and stainless steel DX clips for complete corrosion resistance.

Features

- Ideal for high humidity areas
- Strength exceeds comparable all-aluminum systems
- High tensile steel connection clips on cross tee ends provide plug-in positive-lock insertion for quick installation
- Cross tees with override ends resist twisting and give a professionally finished appearance

AX Double web aluminum tee, aluminum cap, and stainless steel DX clips.

Features

- Noncorrosive, easy-to-handle system for high humidity areas
- High tensile steel connection clips on cross tee ends provide plug-in positive-lock insertion for quick installation
- Cross tees with override ends resist twisting and give a professionally finished appearance

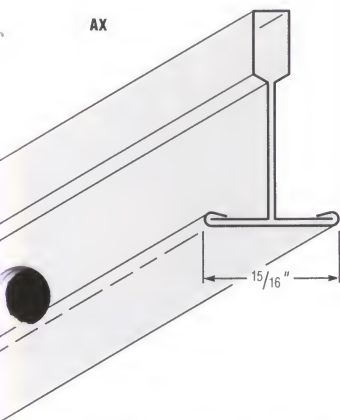
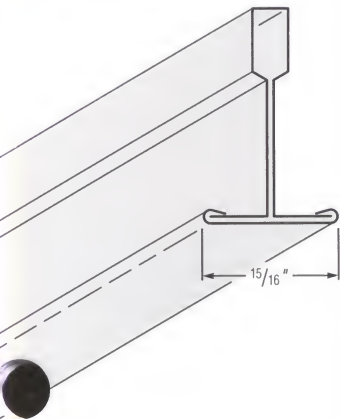
ZXA

ZXLA

AX

ZXA system: Class A.

ZXLA system: Fire-rated ZXLA is accepted in all DXLA designs.



For Square (SQ), Shadowline (SL) and Shadowline Tapered (SLT) edge panels.

Item No.	Class	Length	Height	Tested Load (lbs./LF)		
				4' Hanger Spacing	5' Hanger Spacing	6' Hanger Spacing
Main Tee						
ZXA/ ZXLA 24	Intermediate	12'	1½"	12.4	6.1	3.6
ZXA/ ZXLA 26	Heavy	12'	1½"	16.0	7.3	4.9
Item No.		Length	Height	Tested Load (lbs./LF)		
Cross Tee						
ZXA/ZXLA 224		2'	1½"	65.0		
ZXA/ZXLA 424		4'	1½"	13.7		
ZXA/ZXLA 524		5'	1½"	6.4		

Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.

Metric sizes

The above products are available in metric sizes. To order, add "ME" before the standard item number.

Item No.	Class	Length	Height	Tested Load (lbs./LF)	
				3' Hanger Spacing	4' Hanger Spacing
Main Tee					
AX 26	Light Duty	12'	1½"	16.0	6.9
Item No.		Length	Height	Tested Load (lbs./LF)	
Cross Tee					
AX 224		2'	1½"	22.8	
AX 424		4'	1½"	5.2	

Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.

Metric sizes

The above products are available in metric sizes. To order, add "ME" before the standard item number.

ZXLA Suspension/Gypsum Lay-in Panels



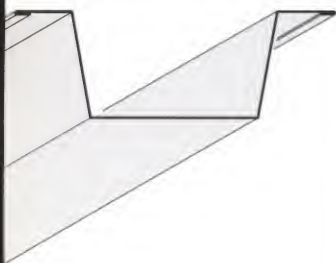
Concealed Grid

Drywall Suspension Grid

DX Concealed Grid



RIGID-X Drywall Suspension Grid



Concealed Suspension System

DX Concealed Grid This system allows the supporting grid to be completely concealed, creating a monolithic, uninterrupted ceiling plane.

Features

- Concealed systems are available to accommodate a variety of upward or downward access requirements
- Light fixtures, air diffusers, and plenum access points can be arranged with great flexibility
- Fire-rated assemblies are available

Item No.	Length	Height	Tested Load (lbs./LF)
<i>Tee Splines</i>			
DE 209	2'	1/2"	3.4
DT 316	3'	1"	10.0
DT 416/DE 415	4'	1"	5.0
DT 416/DEN 415	4'	1"	3.0

Item No.	Length	Height	Tested Load (lbs./LF)
BPA 216	2'	1"	20.0
BPA 316	3'	1"	6.0
BPA 416	4'	1"	4.5
BPA 224	2'	1 1/2"	35.0
BPA 324	3'	1 1/2"	16.0
BPA 424	4'	1 1/2"	6.0
BPA 524	5'	1 1/2"	3.5
FCC/FCZ	2'	3/4"	5.5

Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.

Drywall Suspension System

RIGID X This system is the ideal solution for screw-attaching drywall to a direct hung suspension.

Features

- Combines the installation speed of grid and the durability of black iron furring channel systems into one unique system
- Modular components and knurled face on furring cross channels and furring cross tees for faster screw installation
- Accepts standard lay-in light fixtures and air diffusers
- Many fire-rated designs are available
- Accepts U.S. Gypsum Company SHEETROCK® brand gypsum panels

Item No.	Class	Length	Height	Tested Load (lbs./LF) 4' Hanger Spacing
RMX 12	Heavy Duty	12'	1 1/2"	17.0
Item No.	Length	Height	Maximum Allowable Load (lbs.)	
RCX 4 Cross Channel	4'	7/8"	7.4 ²	
DXLG 424	4'	1 1/2"	13.7	
DXL 424	4'	1 1/2"	13.7	

1. Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.
2. Calculated based on moment of inertia $I_{xx} = .0112 \text{ in.}^4$



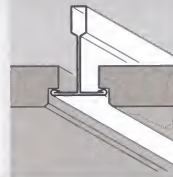
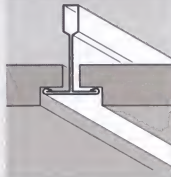
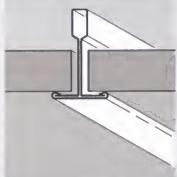
Donn Grid and Edge Selection Guide

Edge Detail

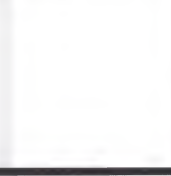
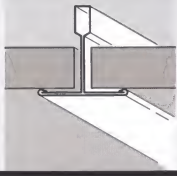
Square Edge (SQ)	Shadowline Tapered (SLT)	Shadowline (SL)	Fineline (FL)	Fineline Bevel (BFL)	Pedestals (PE)	Oval (OV)
						

Grid System

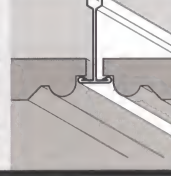
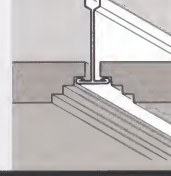
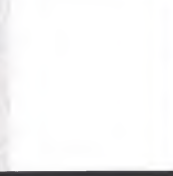
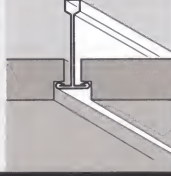
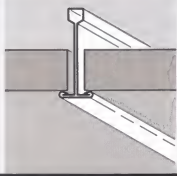
Donn DX



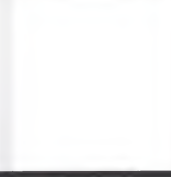
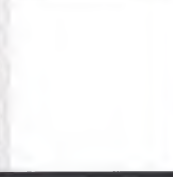
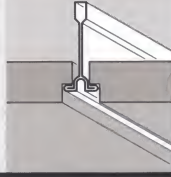
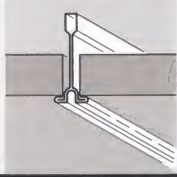
Donn DXW



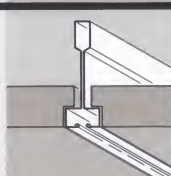
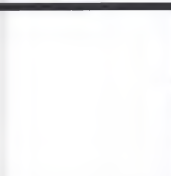
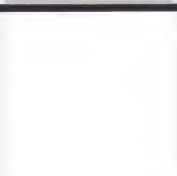
Centricitee



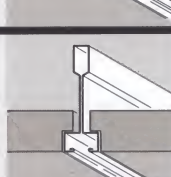
Meridian



Fineline 1/2



Fineline



Donn Concealed

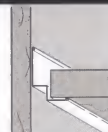


Perimeter Options

M7 Wall Molding—
for standard DX
suspension systems



**MS 174
Shadow Molding—**
for narrow profile
suspension systems



**MS 144
Shadow Molding—**
for standard DX
suspension systems



Checkmate



Chex 16



Crown IL



Crown SL



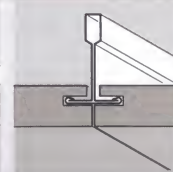
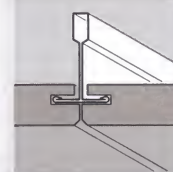
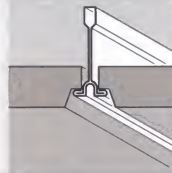
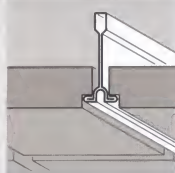
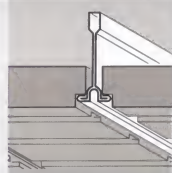
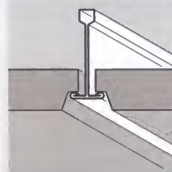
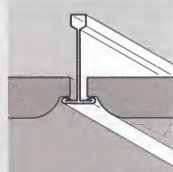
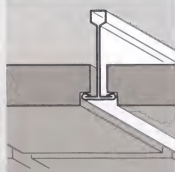
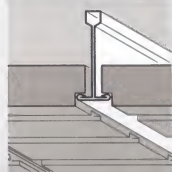
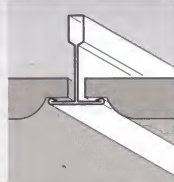
**Interline
Tapered
(ILT)**



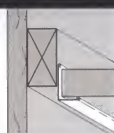
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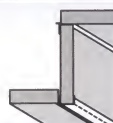
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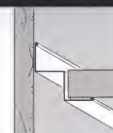
M9 Wall Molding—
for narrow-profile
suspension systems



MF Molding—
for change of level and
bulkheads



**MS 164 Shadow
Molding—**
for bold reveal in DX
suspension systems



Sound/Light Test Data

Product Description ^(A)					Sound Absorption Test Data ^(B)				
Product Line Type	Pattern	Item No.	Size	CAC Range	CAC Minimum	Mounting ^(C)	NRC Range	NRC Minimum	Mounting
X2000 Panels	X2000	76705	¾"x2"x2'	35-39	35	CE	.65-.75	.70	E400
		76709	¾"x2"x2'	35-39	35	CE	.65-.75	.70	E400
	X2000 PREMIER	71805	1"x2"x2'	40-44	40	CE	.75-.85	.80	E400
ECLIPSE Panels	ECLIPSE	76775	¾"x2"x2'	35-39	35	CE	.65-.75	.70	E400
	High-NRC ECLIPSE	76271	¾"x2"x2'	25-29	25	CE	.70-.80	.75	E400
	ECLIPSE PREMIER	71875	1"x2"x2'	40-44	40	CE	.70-.80	.75	E400
ECLIPSE FIRECODE Panels	ECLIPSE	76779	¾"x2"x2'	35-39	35	CE	.65-.75	.70	E400
ORION Panels	ORION 210	64111	½"x2"x4'	20-24	20	CE	.70-.80	.75	E400
	ORION 270	63171	1"x2"x4'	25-29	25	CE	.90-1.00	.95	E400
Backed ORION Panels	ORION 270	61175	1"x2"x2'	35-39	35	CE	.80-.90	.85	E400
ORION FIRECODE Panels	ORION 210	68118	¾"x2"x4'	25-29	25	CE	.70-.80	.75	E400
	ORION 270	68178	¾"x2"x4'	30-34	30	CE	.70-.80	.75	E400
ACOUSTONE Tile & Panels	GLACIER	701	¾"x12"x12"	25-29	25	CCF	.70-.80	.75	E400
	"F" Fissured	101	¾"x12"x12"	50-54	50	Ad ⁽⁷⁾	.65-.75	.70	B
Foil-Backed ACOUSTONE Tile & Panels	Chex/16	416	¾"x24"x24"	40-44	40	CE ^(4,6)	.60-.70	.65	E400
		432	¾"x24"x24"	40-44	40	CE ^(4,6)	.55-.65	.60	E400
		707	¾"x24"x24"	40-44	40	CE ^(3,6)	.70-.80	.75	E400
	"F" Fissured	132	¾"x24"x24"	40-44	40	CEd ⁽³⁾	—	—	—
		133	¾"x24"x24"	40-44	40	CE ^(5,6)	.65-.75	.70	E400
		135	¾"x24"x48"	35-39	35	CE	.65-.75	.70	E405
	Frost	414	¾"x24"x24"	40-44	40	CE ^(3,6)	.65-.75	.70	E400
		715	¾"x24"x24"	35-39	35	CE ⁽³⁾	.70-.80	.75	E400
		713	¾"x12"x12"	35-39	35	CCF	.75-.85	.80	E400
	"F" Fissured	138	¾"x12"x12"	35-39	35	CCF	.70-.80	.75	E400
		141	¾"x24"x24"	40-44	40	CE ⁽⁴⁾	.65-.75	.70	E400
		562	¾"x24"x48"	35-39	35	CE	.50-.60	.55	E400
	Omni Fissured	323	¾"x24"x24"	35-39	35	CE ^(4,6)	.50-.60	.55	E400
		345	¾"x24"x48"	35-39	35	CE	.50-.60	.55	E405
		343	¾"x24"x48"	40-44	40	CE	.60-.70	.65	E400
ACOUSTONE FIRECODE Tile & Panels	Hi-NRC Omni Fissured	3148	¾"x24"x24"	35-39	35	CE ⁽³⁾	.65-.75	.70	E400
		3178	¾"x24"x48"	35-39	35	CE	.65-.75	.70	E400
		464	¾"x24"x48"	35-39	35	CE	.50-.60	.55	E400
	Pin-Perf II	—	¾"x24"x48"	35-39	35	CE	.60-.70	.65	E400
		56705	¾"x24"x48"	35-39	35	CE	.50-.60	.55	E400
		52704	¾"x24"x24"	35-39	35	CE ⁽³⁾	.50-.60	.55	E400
	Surf	5793	¾"x24"x24"	35-39	35	CE	.55-.65	.60	E400
		5794	¾"x24"x48"	35-39	35	CE	.55-.65	.60	E400
		650	¾"x24"x24"	35-39	35	CE ⁽⁶⁾	.55-.65	.60	E400
	Eight/12 (Omni ILLUS)	3570	¾"x24"x48"	40-44	40	CE	.55-.65	.60	E400
		3575	Two/24 (Omni ILLUS)	40-44	40	CE	.55-.65	.60	E400
		654	Eight/12 (Aspen ILLUS)	40-44	40	CE ⁽⁶⁾	.55-.65	.60	E400
	Two/24 (Aspen ILLUS)	652	Two/24 (Aspen ILLUS)	40-44	40	CE ⁽⁶⁾	.55-.65	.60	E400
		586	¾"x24"x48"	40-44	40	CE	.55-.65	.60	E400
		339	¾"x24"x48"	40-44	40	CE	.50-.60	.55	E400
AURATONE Panels	Omni Fissured	474	¾"x24"x48"	40-44	40	CE	.50-.60	.55	E400
		56765	¾"x24"x48"	40-44	40	CE	.50-.60	.55	E400
		675	¾"x24"x48"	40-44	40	CE	.45-.55	.50	E400
	SUPER-E	3845	¾"x24"x24"	35-39	35	CE ⁽³⁾	.60-.70	.65	E400
		56380	¾"x24"x48"	35-39	35	CE	.55-.65	.60	E400
		56096	¾"x24"x48"	40-44	40	CE	.55-.65	.60	E400
	CLEAN ROOM (perf)	56090	¾"x24"x48"	40-44	40	CE	.55-.65	.60	E400
		500	¾"x12"x12"	—	—	—	.40-.50	.45	D20
		504	¾"x12"x12"	40-44	40	CCF	.50-.60	.55	E405
		304	¾"x12"x12"	40-44	40	CCF	.60-.70	.65	E400
AURATONE Tile	Omni Fissured	320	¾"x12"x12"	40-44	40	CCF	.50-.60	.55	E400
		340	¾"x12"x12"	45-49	45	CCF	.55-.65	.60	E400
		501	¾"x12"x12"	45-49	45	CCF	.50-.60	.55	E405
	Pin-Perf	515	¾"x12"x12"	45-49	45	CCF ⁽⁶⁾	.55-.65	.60	E400
		335	¾"x12"x12"	40-44	40	CCF	.55-.65	.60	E400
AURATONE FIRECODE Tile	Aurora	50441	¾"x12"x12"	40-44	40	CCF ⁽⁶⁾	.55-.65	.60	E400
		3270	¾"x24"x48"	45-49	45	CE	—	—	—

Band Center Frequency Hz						Light Reflectance Coefficient ^(m)	Product Page Reference
125	250	500	1000	2000	4000		
.39	.39	.61	.86	.94	.95	.85	4
.36	.38	.59	.85	.94	1.04	N/A	4
.42	.46	.76	.98	1.00	1.07	.81	4
.29	.32	.60	.86	.97	1.08	N/A	6
.65	.67	.65	.88	.88	.82	N/A	6
.45	.44	.82	.93	.97	.97	N/A	7
.35	.35	.60	.84	.93	.99	N/A	6
.72	.77	.64	.86	.85	.76	N/A	10
.74	.82	.82	1.05	1.06	1.09	N/A	10
.42	.43	.82	1.13	1.09	1.02	N/A	10
.60	.60	.71	.92	.80	.62	N/A	10
.49	.60	.61	.86	.94	1.04	N/A	10
.56	.67	.57	.80	.94	1.00	.70	14
.05	.23	.71	.97	.86	.93	—	17
.49	.53	.53	.75	.92	.99	.83	
.22	.29	.66	.80	.83	.89	.81	16
.23	.25	.64	.77	.83	.80	.76	16
.37	.33	.61	1.00	.96	1.03	.67	14
—	—	—	—	—	—	—	
.52	.38	.67	.97	.98	1.02	.77	17
.39	.33	.62	.89	.93	1.02	—	
.32	.33	.64	.93	.93	1.00	.69	
.36	.31	.66	.90	.87	.81	.81	13
.34	.30	.62	1.00	.99	1.03	.67	14
.54	.54	.69	.99	.97	1.10	—	
.52	.50	.67	.95	.94	.99	.82	17
.43	.35	.65	.92	.88	.97	.77	
.42	.34	.44	.72	.67	.64	.78	27
—	—	—	—	—	—	—	
—	—	—	—	—	—	—	
.34	.36	.71	.85	.68	.64	.77	
—	—	—	—	—	—	—	
.37	.30	.49	.68	.75	.81	.78	26
.29	.31	.46	.71	.69	.69	.82	
.23	.33	.65	.80	.77	.76	—	
.42	.51	.68	.85	.79	.78	.84	26
.45	.42	.71	.89	.74	.71	—	
.35	.36	.48	.76	.66	.59	.85	29
.37	.40	.73	.81	.64	.61	.79	
.41	.32	.49	.67	.62	.57	.87	26
.43	.32	.48	.65	.72	.73	.79	
.36	.39	.61	.76	.67	.63	.70	26
.34	.29	.56	.80	.70	.65	.74	26
.29	.37	.60	.73	.64	.66	.70	25
.31	.33	.54	.76	.74	.77	.77	22
.33	.30	.57	.75	.71	.77	.77	
.27	.29	.59	.76	.72	.75	.73	22
.30	.32	.63	.78	.73	.76	.71	
.34	.30	.53	.78	.73	.69	—	27
.27	.29	.53	.74	.71	.68	.79	26
.30	.29	.52	.67	.64	.58	.88	29
.29	.29	.57	.74	.66	.58	.83	26
.30	.32	.46	.64	.53	.39	.85	34
.36	.35	.66	.86	.71	.74	.72	25
.28	.24	.52	.81	.76	.40	.81	30
.30	.30	.53	.86	.71	.47	.76	34
.43	.31	.53	.81	.68	.51	.77	35
.17	.54	.30	.42	.50	.48	—	27
.42	.29	.52	.68	.64	.69	.82	
.50	.36	.76	.73	.69	.72	.82	
.36	.34	.61	.71	.60	.41	.78	26
.32	.38	.61	.74	.62	.48	.78	
.53	.30	.59	.63	.58	.55	.85	29
.59	.33	.45	.78	.79	.70	.80	27
.32	.35	.60	.77	.70	.53	.79	26
.48	.34	.64	.74	.71	.80	.64	25
—	—	—	—	—	—	—	33

Test Performance Standards & Agencies

Product performance test results are reported throughout this catalog. Here are the standards and procedures referenced:

AMA 1-II

AMA 1-II: Ceiling Sound Transmission Tests by the Two-Room Method—determines sound transmission between two adjacent rooms when the path is through the two ceilings and the plenum common to both. Results previously called CSTC value, now referred to as Ceiling Attenuation Class (CAC).

American Society for Testing and Materials (ASTM)

ASTM C423: Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method—covers the measurement of the sound absorption of acoustical materials in a diffused sound field (NRC).

ASTM C523: Light Reflectance of Acoustical Materials by the Integrating Sphere Reflectometer—establishes the method for measuring light reflectance of acoustical materials where the application is primarily for predicting room illumination level.

ASTM C635: Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings—establishes materials, tolerances, testing and performance of suspension systems.

ASTM C636: Installation of Metal Suspension Systems for Acoustical Tile and Lay-in Panels—describes procedures for the installation of suspension systems and recommends acceptable tolerances.

ASTM E84: Surface Burning Characteristics of Building Materials—describes the "tunnel test" method for comparing surface burning characteristics of the materials tested without specific considerations of all the end use parameters that might affect the surface burning characteristics.

ASTM E119: Fire Tests of Building Construction and Materials—prescribes a standard exposure fire test method of controlled extent and severity to determine performance of ceilings, walls, columns, floors and other building members under exposure to fire.

ASTM C117: Steady State Thermal Transmission Properties by Means of the Guarded Hot Plate—measures thermal resistance "R" values of building materials.

ASTM E795: Practices for mounting test specimens during sound absorption tests (C423).

ASTM C367: Test methods for strength properties of prefabricated acoustical tile and lay-in panels (ball hardness test).

Federal Specifications (FS)

Federal Specification SS-S-118B: Sound Controlling (Acoustical) Tiles and Panels, June 13, 1980—describes the types of boards and tile. See new ASTM standard E1264.

Underwriters Laboratories Inc. (UL)

Fire Resistance Directory—describes the fire resistance of building assemblies using acoustical materials.

Building Materials Directory—provides Surface Burning Characteristics data: (1) flame spread, (2) smoke developed, during fire exposure.

(A) Data on physical properties for sound control products were obtained by testing at recognized laboratories. Sound-test surfaces were painted. Procedures were according to:

- ASTM C523 for light reflectance
- ASTM C423 for sound absorption
- AMA 1-II for sound attenuation

(B) Sound absorption test specimen mountings: B—adhesive application to gypsum board; D20—stapled to wood furring strips; E400 or E405—metal suspension system. Mountings are designations from ASTM Standard E795-83.

(C) Sound attenuation test specimen mountings, coded: (1st letter) Ad—Adhesive attachment, C—Continuous at partitions, I—Interrupted at partitions; (2nd letter) C—Concealed suspension system, E—Exposed suspension system; (3rd or 4th letter) F—Flat splines, T—Tee splines, X—accessible feature; a—one layer 1 1/2" THERMAFIBER® sound attenuation fire blankets, laid on ceiling continuous; d—two layers 1 1/2" THERMAFIBER sound attenuation fire blankets, laid on ceiling in an 8-ft width centered over the partition; I—inverted-T plenum barrier of 3" THERMAFIBER sound attenuation fire blankets, centered above partition continuous.

(D) Light reflectance coefficients (1.00=100% reflected) are classified by Fed. Spec. SS-S-118B/ASTM E1264 into Grades as follows: LR 1, .75 or greater; LR 2, .70-.74; LR 3, .65-.69; LR 4, .60-.64; less than .60, ungraded.

(2) Tile adhesively attached to 1/2" gypsum panels screw-attached to indirect hung suspension, and interrupted at partition.

(3) Shadowline (rabbeted) edge configuration.

(4) USG Profile grid (no longer available).

(5) Interline (rabbeted) edge configuration, FINELINE exposed grid.

(6) Tested at USG Corporation Acoustical Systems Laboratory and witnessed by outside consultants.

Fire Rated Ceiling Systems

UL Design No.	Assembly Rating	Approved Types	Tile/Panel Sizes	Approved Light Fix. Protection	Maximum Fix. Size % Ceiling Area	Duct Area Per 100 Sq. Ft of Ceiling Area	Assembly Construction Details
A Floor-Ceiling Designs—Concrete with Cellular Steel Floor Units and Beam Support							
Exposed Grid System and Lay-in Panels							
A203	3 hr, R; 3 hr, U 3 hr, URB	¾ GR-1; ¾ FR-83	2 by 4	THERMAFIBER LFPB Tent	2 by 4—16%	57 sq. in.	Floor/Ceiling; 2 ½" Concrete; Cellular Deck Beam W 12 x 27
A207	3 hr, R; 3 hr, UR 4 hr, URB	GR-1 FR-83; FR-X1	2 by 4	THERMAFIBER LFPB Tent	2 by 4—16%	113 sq. in.	Floor/Ceiling; 2 ½" Concrete; Cellular Deck Beam W8 x 40
A204	2 hr, R; 2 hr, UR 2 hr, URB	GR-1; FR-83; FR-84 FR-4; M; FR-X1	2 by 4	THERMAFIBER LFPB Type FR; Acoustical Tent	2 by 4—24%	113 sq. in.	Floor/Ceiling; 3" Concrete; Cellular Deck Beam W8 x 28
Concealed Grid System and Tile							
A003	3 hr, R; 3 hr, UR 3 hr, URB	¾ FR-81	12 by 12 12 by 24	THERMAFIBER LFPB Type FR	2 by 4—8%	None	Floor/Ceiling; 2 ½" Concrete; Cellular Deck Beam W10 x 25
A009	3 hr, R; 3 hr, UR 4 hr, URB	¾ GR	12 by 12	THERMAFIBER LFPB Box	2 by 4—16%	110 sq. in.	Floor/Ceiling; 2 ½" Concrete; Cellular Deck Beam W8 x 40
A010	2 hr, R; 1 ½ hr, UR 1 ½ hr, URB	G or W AP	12 by 12	THERMAFIBER LFPB; Box	2 by 4—16%	50 sq. in.	Floor/Ceiling; 2 ½" Concrete; Cellular Deck Beam W8 x 31 min
D Floor-Ceiling Designs—Concrete with Steel Floor Units and Beam Support							
Exposed Grid System and Lay-in Panels							
D201	2 hr, R; 2 hr, UR 3 hr, URB	GR-1; FR-83; FR-4 M; FR-X1; FR-X2; FR-84	2 by 4; 2 by 2 20 by 60	THERMAFIBER LFPB Type FR Acoustical Box	2 by 4—24%	576 sq. in.	Floor/Ceiling; 2 ½" Concrete; Cellular or Fluted Deck; Beam W8 x 28
D209	2 hr, R; 1 ½ hr, UR 1 ½ hr, URB	GR-1; FR-83; FR-4M FR-X1; FR-X2	2 by 2 2 by 4	THERMAFIBER LFPB; Type FR; Acoustical Tent	2 by 4—8%	None	Floor/Ceiling; 2 ½" Concrete; Cellular or Fluted Deck; Beam W10x 21
G Floor-Ceiling Designs—Concrete and Steel Joists							
Exposed Grid System and Lay-in Panels							
G211	3 hr, R 3 hr, UR	GR-1 FR-83; FR-X1	2 by 2 2 by 4	THERMAFIBER LFPB Tent; Acoustical Box	2 by 4—16%	113 sq. in.	Floor/Ceiling; 3" Concrete; Metal Lath 10" Bar Joists 24" o.c.
G213	3 hr, R; 3 hr, UR 3 hr, URB	GR-1; FR-4 FR-83; M; FR-X1; FR-84	2 by 4	THERMAFIBER LFPB Type FR; Acoustical Box	2 by 4—24%	154 sq. in.	Floor/Ceiling; 3 ½" Concrete; Metal Lath or Deck 10" Bar Joists 24" o.c.; Beam W6 x 12
G202	2 hr, R 2 hr, UR	GR-1; FR-84 FR-83; FR-X1 FR-X2	2 by 2; 2 by 4 24 by 60 20 by 60	THERMAFIBER LFPB Type FR Acoustical Box	20 by 48; 24 by 48 20 by 60—24% HID 2 by 2—12%	576 sq. in.	Floor/Ceiling; 2 ½" Concrete; Metal Lath 10" Bar Joists 24" or 30" o.c.
G204	2 hr, R; 2 hr, UR 2 hr, URB	GR-1; FR-83; FR-84 FR-4; M; FR-X1 FR-X2	2 by 2; 2 by 3 2 by 4; 20 by 60 30 by 60; 24 by 60	THERMAFIBER; LFPB Type FR; Acoustical Box	24 by 60; 24 by 48 24 by 24; 24%	2 by 24; 2 by 3 113 sq. in.; 2 by 4, 30 by 60; 576 sq. in.	Floor/Ceiling; 2 ½" Concrete; Metal Lath or Deck 10" Bar Joists 30" o.c.; Beam W6 x 12
G215	2 hr, R 2 hr, UR 2 hr, URB	GR-1; FR-83 FR-4; FR-84 FR-X1; FR-X2	2 by 2 2 by 4 20 by 60	THERMAFIBER LFPB Type FR	20 by 48 20 by 60—24% HID 2 by 2—2%	154 sq. in.	Floor/Ceiling; 2 ½" Concrete; Metal Lath 10" Bar Joists 24" o.c.; or Hambro System Beam W10 x 21
G222	2 hr, R; 2 hr, UR 2 hr, URB	FC-CB	2 by 2	THERMAFIBER LFPB Tent	2 by 4—12%	57 sq. in.	Floor/Ceiling; 2 ½" Concrete; Metal Lath 10" Bar Joists 24" o.c.; Beam W8 x 24
G227	2 hr, R 2 hr, UR 3 hr, URB	GR-1 FR-83	2 by 2 2 by 4	THERMAFIBER LFPB Tent; Acoustical Tent	2 by 4—16%	57 sq. in.	Floor/Ceiling; 2 ½" Concrete; Metal Lath or Deck 10" Bar Joists 24" o.c. or Hambro System Beam W8 x 31
G228	2 hr, R; 2 hr, UR 2 hr, URB	AP	2 by 2	THERMAFIBER LFPB Tent	2 x 2—12%	57 sq. in.	Floor/Ceiling; 2 ½" Concrete; Metal Lath or Deck 10" Bar Joists 24" o.c.; Beam W8 x 31
G231	2 hr, R; 2 hr, UR 3 hr, URB	¾ GR-1 ¾ FR-83	2 by 2 to 30 by 60	THERMAFIBER LFPB Tent Acoustical Tent	2 by 4—16%	57 sq. in.	Floor/Ceiling; 2 ½" Concrete; Metal Lath or Deck 8" Bar Joists 24" o.c.
G265	2 hr, R; 2 hr, U 2 hr, URB	GR-1; FR-83 FR-X1	2 by 2; SQ, IL or ILT Edge	Acoustical 3 Sided	2 by 2—24%	113 sq. in.	Floor/Ceiling; 2 ½" Concrete; Metal Lath 10" Bar Joists 24" o.c.
G259	1 ½ hr, R; 1 ½ hr, UR 1 ½ hr, URB	FC-CB	2 by 4	Gypsum Bd 3 Sided	2 by 4—16%	57 sq. in.	Floor/Ceiling; 2 ½" Concrete; Metal Lath; 10" Bar Joists 24" o.c.; Beam W8 x 31
G262	1 ½ hr, R 1 ½ hr, UR	GR-1; FR-83 FR-X1	2 by 2; SQ, IL or ILT Edge	Acoustical 3 Sided	2 by 4—24%	113 sq. in.	Floor/Ceiling; 2 ½" Concrete; Steel Deck 8" Bar Joists 24" o.c.
G264	1 ½ hr, R 1 ½ hr, UR	GR-1; FR-X1 FR-83; FR-X2	2 by 2 Fineline Edge	Acoustical 3 Sided	2 by 2—24%	113 sq. in.	Floor/Ceiling; 2 ½" Concrete; Steel Deck 8" Bar Joists 24" o.c. or Hambro System
G201	1 hr, R 1 hr, UR	GR-1; FR-X2; FR-X1; FR-83	2 x 2; 2 x 4	None	2 by 4—8%	None	Floor/Ceiling; 2" Concrete; Metal Lath or Deck 10" Bar Joists; 24 to 78" o.c. or Hambro System
G262	1 hr, R; 1 hr, U	AP-1	2 by 2 IL or ILT Edge	Acoustical 3 Sided	2 x 4—24%	13 sq. in.	Floor/Ceiling; 2 ½" Concrete; Steel Deck 8" Bar Joists 24" o.c.
G264	1 hr, R; 1 hr, U	AP-1	2 by 2 FL Edge	Acoustical 3 Sided	2 x 2—24%	13 sq. in.	Floor/Ceiling; 2 ½" Concrete; Steel Deck 8" Bar Joists 24" o.c.
Concealed Grid System and Tile							
G017	3 hr, R 3 hr, UR	AP	12 by 12	N/A	None	50 sq. in.	Floor/Ceiling; 2 ½" Concrete; Metal Lath 10" Bar Joists 24" o.c.
G002	2 hr, R 2 hr, UR	FR-81	12 by 12 12 by 24	Mineral Fiberboard Box	2 by 4—24%	576 sq. in.	Floor/Ceiling; 2 ½" Concrete; Metal Lath 10" Bar Joists 24" o.c.
G007	2 hr, R; 2 hr, UR 2 hr, URB	FR-81	12 by 12; 12 by 24 24 by 24	THERMAFIBER LFPB Type FR	1 by 4—16% or 2 by 4—24%	196 sq. in.	Floor/Ceiling; 2 ½" Concrete; Metal Lath 10" Bar Joists 24" o.c.; Beam W10 x 21
G008	2 hr, R; 2 hr, UR 2 hr, URB	GR	12 by 12 to 24 by 24	THERMAFIBER LFPB Tent	2 by 4—16%	288 sq. in.	Floor/Ceiling; 2 ½" Concrete; Metal Lath or Deck 10" Bar Joists 24" o.c.; Beam W8 x 31
G011	2 hr, R; 2 hr, UR 3 hr, URB	AP	12 by 12 12 by 24	THERMAFIBER LFPB Tent	2 by 4—15%	57 sq. in.	Floor/Ceiling; 2 ½" Concrete; Metal Lath 10" Bar Joists 24" o.c.; Beam W10 x 24 min
G018	2 hr, R 2 hr, UR	G or W AP	12 by 12	N/A	None	50 sq. in.	Floor/Ceiling; 2 ½" Concrete; Metal Lath or Deck 10" Bar Joists 24" o.c.
G019	2 hr, R 2 hr, UR	GR	12 by 12	THERMAFIBER LFPB Box	2 by 4—24%	113 sq. in.	Floor/Ceiling; 2 ½" Concrete; Metal Lath 10" Bar Joists 24" o.c.
G037	2 hr, R; 2 hr, UR 2 hr, URB	AP	12 by 12	THERMAFIBER; LFPB Tent	2 x 4—24%	288 sq. in.	Floor/Ceiling; 2 ½" Concrete; Steel Deck 8" Bar Joists 24" o.c.; Beam W6 x 25
G020	1 ½ hr, R 1 ½ hr, UR	G or W AP	12 by 12	N/A	None	50 sq. in.	Floor/Ceiling; 2" Concrete; Metal Lath 10" Bar Joists 24" o.c.

UL Design No.	Assembly Rating	Approved Types	Tile/Panel Sizes	Approved Light Fix. Protection	Maximum Fix. Size % Ceiling Area	Duct Area Per 100 Sq. Ft. of Ceiling Area	Assembly Construction Details
J or K Floor-Ceiling Designs—Precast and Field Poured Concrete							
Exposed Grid System and Lay-in Panels							
J201	2 hr, R 2 hr, UR	GR-1; FR-83; FR-84 FR-4; M; FR-X1; FR-X2	2 by 2; 2 by 4 20 by 60	THERMAFIBER LFPB Type FR; Acoustical Box	2 by 4—24%	576 sq. in.	Floor/Ceiling; 2½" Concrete Floor With 6" Concrete Joists
J202	2 hr, R 2 hr, UR	GR-1; FR-83 FR-X1; FR-X2	2 by 2 2 by 4	THERMAFIBER LFPB Tent; Acoustical Box	2 by 4—14%	57 sq. in.	Floor/Ceiling; Precast Concrete; 2" Deck, Stems 4" o.c.
L Floor-Ceiling Designs—Wood or Combination Wood and Steel Joists Assemblies							
Exposed Grid System and Lay-in Panels							
L211 (P237)	2 hr, UR Finish Rating 75 min.	FR-4	2 by 4	THERMAFIBER LFPB Type FR Box	1 by 4—16% 2 by 2—20% 2 by 4—24%	144 sq. in.	Floor/Ceiling; Wood Floor and Joists 2 x 10 16" o.c.; ½" FIRECODE C Gypsum Panel Ceiling w/6" Fiberglass Insulation
L202	1 hr, UR Finish Rating 15 min.	GR-1; FR-83 FR-4; M; FR-X1	2 x 4 24 x 60	THERMAFIBER LFPB Tent Acoustical Box	2 by 4—16%	110 sq. in.	Floor/Ceiling; Wood Floor and Joists 2 x 10— 16" o.c.
L206	1 hr, UR Finish Rating 17 min.	GR-1; FR-83 FR-X1; FR-X2	2 x 2 2 x 4	THERMAFIBER LFPB Tent; Acoustical Box	2 by 4—8%	110 sq. in.	Floor/Ceiling; Wood Floor and Joists 2 x 10— 16" o.c.
L206	1 hr, UR Finish Rating 17 min.	FC-CB	2 by 2 2 by 4	THERMAFIBER LFPB Tent; Acoustical Tent	2 by 4—8%	110 sq. in.	Floor/Ceiling; Wood Floor and Joists 2 x 10 16" o.c.
L212 (P238)	1 hr, UR Finish Rating 17 min.	FR-4	2 x 2 2 x 4	Acoustical Box	1 by 4—12% 2 by 2—16% 2 by 4—24%	576 sq. in.	Floor/Ceiling Wood Floor and Joists 2 x 10— 16" o.c.
Concealed Grid System and Tile							
L003	1 hr, UR Finish Rating 17 min.	G or W AP	12 by 12	N/A	None	None	Floor/Ceiling; Wood Floor and Joists 2 x 10 16" o.c.
L006	1 hr, UR Finish Rating 12 min.	FR-81	12 by 12 12 by 24	THERMAFIBER LFPB Box	1 by 4, 20 by 48 20 by 60—14%	Linear; 10 ft. per 100 sq. ft.	Floor/Ceiling; Wood Floor and Joists 2 x 10; 16" o.c.
P Roof-Ceiling Designs							
Exposed Grid System and Lay-in Panels							
P213	2 hr, R; 2 hr, U	¾" GR-1; ¾" FR-83 FR-X1	2 x 4	THERMAFIBER LFPB Tent	2 by 4—16%	110 sq. in.	Roof/Ceiling; 2" Planks, Insulation; 14" Bar Joists, 84" o.c.
P237	2 hr, R 2 hr, UR 2 hr, URB	FR-4	2 by 4	THERMAFIBER LFPB Type FR Box	1 by 4—16% 2 by 2—20% 2 by 4—24%	144 sq. in.	Roof/Ceiling; Unlimited Insulation; Steel Deck 8" Bar Joists 72" o.c.; ½" FIRECODE C Gypsum Panel Ceiling w/6" Fiberglass Insulation
P241 (P237)	2 hr, R, 2 hr, UR	FR-4	2 by 4	THERMAFIBER LFPB; Type FR Box	1 by 4—16% 2 by 2—20% 2 by 4—24%	144 sq. in.	Roof/Ceiling; Insulating Concrete; Steel Deck 10" Bar Joists 72" o.c.; ½" FIRECODE C Gypsum Panel Ceiling w/6" Fiberglass Insulation
P230	1½ hr, R 1 hr, UR 1 hr, URB	GR-1; FR-4 FR-83; FR-84 FR-X1; FR-X2	2 x 2 2 x 4	THERMAFIBER LFPB Type FR Acoustical Box	2 by 4—24%	255 sq. in.	Roof/Ceiling; Unlimited Insulation; Wallboard Gypsum or DUROCK on Steel Deck; 10" Bar Joists 72" o.c. Beam W6 x 12
P201	1 hr, UR; 1 hr, UR 1 hr, URB	FR-83; GR-1 FR-X1; M	2 x 4	N/A	None	None	Roof/Ceiling; Steel Deck; ¾" Insulation; 10" Bar Joists 84" o.c.; Beam W8 x 17
P202	1 hr, R; ¾ hr, UR 1 hr, URB	FR-83; GR-1 FR-X1; M	2 x 4	THERMAFIBER LFPB Box; Acoustical Box	2 by 4—16%	57 sq. in.	Roof/Ceiling; Steel Deck; 1" Insulation 8" Bar Joists 48" o.c.
P214	1 hr, R; 1 hr, UR 1 hr, URB	¾" GR-1 ¾" FR-83	2 x 2 2 x 4	THERMAFIBER LFPB Tent; Acoustical Box	2 by 4—16%	57 sq. in.	Roof/Ceiling; Steel Deck ¾" to 1½" Insulation 10" Bar Joists 72" o.c.
P235	1 hr, R; 1 hr, UR 1 hr, URB	GR-1; FR-83 FR-84; FR-X1	2 x 4	THERMAFIBER LFPB Type FR	2 by 4—24%	144 sq. in.	Roof/Ceiling; Foamed Plastic Insulation; Wallboard Gypsum; Steel Deck, 10" Bar Joists 72" o.c. Beam W8 x 15
P238	1 hr, R 1 hr, UR 1 hr, URB	FR-4	2 x 2 2 x 4	Acoustical Box	1 by 4—12% 2 by 2—16% 2 by 4—24%	576 sq. in.	Roof/Ceiling; Unlimited Insulation; Steel deck, 8" Bar Joists 48" o.c.; Beam W6 x 12, Ceiling Panels; Backloaded w/ 6" Fiberglass
P245 (P238)	1 hr, R 1 hr, UR	FR-4	2 x 2 2 x 4	Acoustical Box	1 by 4—12% 2 by 2—16% 2 by 4—24%	576 sq. in.	Roof/Ceiling; ¾" Insulation over 2" Bldg Units 14" Bar Joists 84" o.c.; Ceiling Panels Backloaded w/ 6" Fiberglass
P246	1 hr, R 1 hr, UR 1 hr, URB	GR-1 FR-83; FR-84 FR-X1; FR-X2	2 x 2 2 x 4 20 x 60	THERMAFIBER LFPB Type FR	2 by 2—20% 2 by 4—24%	576 sq. in.	Roof/Ceiling; Insulating Concrete over Foamed Plastic, Steel Deck; 8" Bar Joists 72" o.c. Beam W8 x 15
P254	1 hr, R ¾ hr, UR; ¾ hr, UB	¾" GR-1 ¾" FR-83	2 x 2 FL Edge	Acoustical 5 Sided	2 by 2 or 2 by 4—24%	113 sq. in.	Roof/Ceiling; Unlimited Insulation; Wallboard Gypsum; Steel Roof Deck, 10" Bar Joists 48" to 72" o.c.
P255	1 hr, R 1 hr, UR 1 hr, URB	GR-1; FR-83 FR-X1 FR-X2	2 x 2 2 x 4	Acoustical Box	2 by 4—24%	57 sq. in.	Roof/Ceiling; Insulating Concrete over Foamed Plastic, Steel Deck; 8" Bar Joists 72" o.c. Beam W8 x 15
P257	1 hr, UR	GR-1; FR-83 FR-84; FR-X1 FR-X2	2 x 2 2 x 4	THERMAFIBER LFPB Type FR Acoustical Box	2 by 4—25%	255 sq. in.	Roof/Ceiling; 4½" Insulation; Wallboard Gypsum over Steel Deck, 7½" Steel "C" Joists 24" o.c.
P203	¾ hr, R ¾ hr, UR; ¾ hr, URB	FR-83; M; GR-1 FR-X1	2 x 4	THERMAFIBER LFPB Type FR Acoustical Box	2 by 4—24%	113 sq. in.	Roof/Ceiling; Steel Deck 1" to 2" Insulation 8" Bar Joists 60" o.c.

FIRECODE ACOUSTONE Tile

G = Frost, GLACIER, "F" Fissured ceiling tile
W = Frost, GLACIER, "F" Fissured ceiling tile
AP = Frost, GLACIER, "F" Fissured ceiling tile

FIRECODE ACOUSTONE Panels

AP = LINEAR EXPRESSIONS, SANDRIFT, Frost, GLACIER, "F" Fissured ceiling panels
AP-1 = LINEAR EXPRESSIONS, SANDRIFT, Frost, GLACIER, "F" Fissured ceiling panels

FIRECODE Gypsum Lay-In Panels

FC-CB = Gypsum Lay-In ceiling panels

FIRECODE AURATONE Tile

GR = Allegro, Calypso, Omni Fissured, Fine Fissured, Corona, Corona 90, Fissured ceiling tile
FR-81 = Omni Fissured, Fine Fissured, Corona, Corona 90, Fissured ceiling tile

FIRECODE AURATONE, ORION, X2000 and ECLIPSE Panels

GR-1 = ILLUSIONS, Allegro, Calypso, Surf, Aspen, Omni Fissured, Natural Fissured II, Fine Fissured, Corona, Corona 90, Fissured, Pin Perf. II, SUPER-E ceiling panels
FR-X1 = ORION ceiling panels
FR-X2 = ECLIPSE, X2000 ceiling panels
FR-83 = DESIGNER SQUARES, Omni Fissured, Natural Fissured II, Fine Fissured, Corona, Corona 90, Fissured, Pin Perf. II, Pebbled, ROCK FACE, IMPACTION, CLEAN ROOM ceiling panels
FR-84 = PREMIER Fine Fissured, PREMIER Natural Fissured II ceiling panels
FR-4 = CERAMIC HERITAGE ceiling panels
M = METAL FACE ceiling panels (2' x 4' panels only)

Fire Rated Ceiling Systems

UL Design No.	Assembly Rating	Module Size	Panel Thickness	Panel Mfr.	% Fixtures Per 100 sq. ft.	Air Openings in.²/100 sq. ft.	Concrete Thickness
A Floor-Ceiling Designs—Concrete with Cellular Steel Floor Units and Beam Support							
Exposed							
DXL Suspension—Concrete on Ribbed or Corrugated Deck							
A-207	2 hr.	24" x 48"	¾", ¾"	USG Interiors	16%	113	2½"
D Floor-Ceiling Designs—Concrete with Steel Floor Units and Beam Support							
Exposed							
DXL Suspension—Concrete on Full Cellular Deck							
D-215	1½ hr., 2 hr. & 4 hr.	24" x 48"	¾"	USG Interiors	16%	113	2½"
G Floor-Ceiling Designs—Concrete and Steel Joists							
Exposed							
DXL/DXLA Suspension—Concrete on Metal Lath							
G-204 (DXL)	2 hr.	24", 30" x 60" 24" x 24", 48", 36"	¾"	USG Interiors	24% 2' x 2', 2' x 4', 20" x 60"	57	2½"
G-211	2 hr. & 3 hr.	24" x 24" x 48"	¾", ¾"	USG Interiors	16%	113	2½" (2 hr.) 3" (3 hr.)
G-213 (DXL)	2 hr. & 3 hr.	24" x 48"	¾", ¾"	USG Interiors	24%	576 (2 hr.) 154 (3 hr.)	2½" (2 hr.) 3½" (3 hr.)
G-222	2 hr.	24" x 24"	½"	USG Interiors	12%	57	2 ½"
G-231 (DXL)	2 hr.	24" x 24" to 30" x 60"	¾", ¾"	USG Interiors	16%	57	2½"
G-259	1½ hr.	24" x 48"	¾"	USG Interiors	16%	57	2½"
G-201	1 hr.	24" x 24", 48"	¾"	USG Interiors	8%	—	2"
DXL/DXLA Suspension—Concrete on Ribbed or Corrugated Deck							
G-211	2 hr. & 3 hr.	24" x 24", 48"	¾", ¾"	USG Interiors	16%	113	2½" (2 hr.) 3" (hr.)
G-213 (DXL)	2 hr. & 3 hr.	24" x 48"	¾", ¾"	USG Interiors	24%	576 (2 hr.) 154 (3 hr.)	2½" (2 hr.) 3½" (3 hr.)
CENTRICITEE Suspension—Concrete on Corrugated Steel Deck							
G-262	1½ hr.	24" x 24"	¾"	USG Interiors	24%	113	2½"
CENTRICITEE Suspension—Concrete on Metal Lath							
G-265	2 hr.	24" x 24"	¾", ¾"	USG Interiors	24%	113	2½"
FINELINE Suspension—Concrete on Corrugated Steel Deck							
G-264	1½ hr.	24" x 24"	¾"	USG Interiors	24%	113	2½"
L Floor-Ceiling Designs—Wood or Combination Wood and Steel Joists Assemblies							
Exposed							
DXL Suspension—Wood Joist—2' x 10'							
L-206	1 hr.	24" x 24", 48"	¾", ¾"	USG Interiors	8%	110	**
L-202	1 hr.	24" x 24", 48"	¾", ¾"	USG Interiors	16%	113	**
P Roof-Ceiling Designs							
Exposed							
DXL/DXLA Suspension—Mineral Fiber on Fluted Steel Deck							
P-214 (DXL)	1 hr.	24" x 24", 48"	¾", ¾"	USG Interiors	16%	57	**
P-230	1 hr.	24" x 24", 48" or 20" x 60"	¾", ¾"	USG Interiors	24%	255	—
P-238 (DXL)	1 hr.	24" x 24", 48"	¾"	USG Interiors	16%/24%	576	**
DXL/DXLA Suspension—Foam Insulation on Fluted Steel Deck							
P-255	1 hr.	24" x 24", 48"	¾", ¾"	USG Interiors	24%	57	2" min.
FINELINE Suspension—Built-up Roof on Fluted Steel Deck							
P-254	1 hr. (Restrained) & ¾ hr. (Unrestrained)	24" x 24"	¾"	USG Interiors	24%	113	N/A

* General Notes:

- Hanger wire should be located between the main tee splice and the expansion relief notch and a maximum 48" o.c., or per the requirements of the specific UL design.
- All 60" cross tees are to have hanger wires at their midpoint.
- Assemblies are tested with the method and criteria established in Standard UL 263, also known as A2.1, ASTM E-119 and NFPA 251.
- Hold down clips are required when the fire-rated board used weighs less than 1.0 lb./ft.²
- % Fixtures column indicates 24" x 48" fixture only, unless noted. Check for suspension requirements.
- Some designs pertain for DXL only. Contact UL Fire Resistance Directory and revisions to confirm all information listed in these tables.
- DXLR and ZXLA are also listed by UL.
- DXL has been used in many other industry fire tests and listed in reports such as the National Evaluation Reports, for example, NER-148 and NER-399 (wood truss constructions).

** Check UL Designs for deck options.

Additional DXL Fire-Rated Assemblies

3 hr.: G-229
2 hr.: A-202, D-208, G-208, G-209, G-218, G-229, G-236, G-243, G-250, G-258 [Concealed systems D-010, G-022]
1½ hr.: A-210, G-229, G-241, G-243, L-208, P-207, P-225, P-227, P-231, P-251
1 hr.: G-241, L-206, L-209, L-210, L-212, P-206, P-210, P-225, P-227, P-244, P-245, P-257, P-509, P-513
¾ hr.: P-204

L.A. Research Report Compliance

DOWN suspension systems manufactured by USG Interiors, Inc. comply with one or more of the following L.A. Research Report numbers: 22179, 23541, 24095.

RIGID-X Fire-Rated Assemblies

Concrete and Steel Joists: Concrete on Metal Lath

1½ hr.: G-528
2 hr.: G-526
2 hr. & 3 hr.: G-523, G-529

Precast and Field Poured Concrete: Preset Concrete

2 hr. & 3 hr.: J-502

Wood or Combination Wood and Steel Joist Assemblies: Wood Joists—2 x 10

1 hr.: L-525

Wood or Combination Wood and Steel Joist Assemblies: Plywood with Wood Truss

1 hr.: L-529

Wood or Combination Wood and Steel Joist Assemblies: Gypsum Concrete

1 hr. & 1½ hr.: P-507

Wood or Combination Wood and Steel Joist Assemblies: Gypsum Plank, Insulation Board

1½ hr.: P-506

Wood or Combination Wood and Steel Joist Assemblies: Corrugated Steel Deck with

Insulation Board or Foam Plastic Insulation

1 hr. & 1½ hr.: P-510

Fire and Sound Accessories

Fire Protection—THERMAFIBER kits provide maximum protection around light fixtures. Made from mineral fiber, THERMAFIBER insulation's melt point is over 2000°F, far higher than glass fiber. Surface burning characteristics of THERMAFIBER insulation are flame spread—15, smoke developed—0 (ASTM E84 test procedure). THERMAFIBER insulation has been fire tested in dozens of ACOUSTONE and AURATONE ceilings and rated up to 3 hours.

THERMAFIBER insulation is lightweight (.63 lb/ft²), so it will not overstress conventional grid systems. Plus its optimum density reduces sound transmission and heat leaks through the ceiling.

THERMAFIBER light fixture protection kits come already sized for assembly around standard 2' x 4' fixtures. Or they can be easily cut with a utility knife to fit 1' x 4' or 2' x 2' fixtures or other special size fixtures. THERMAFIBER light fixture protection is easily wire-tied and suspended over fixtures. Each kit contains enough material for protection of 10 2' x 4' fixtures, 17 2' x 2' fixtures, or 20 1' x 4' fixtures.

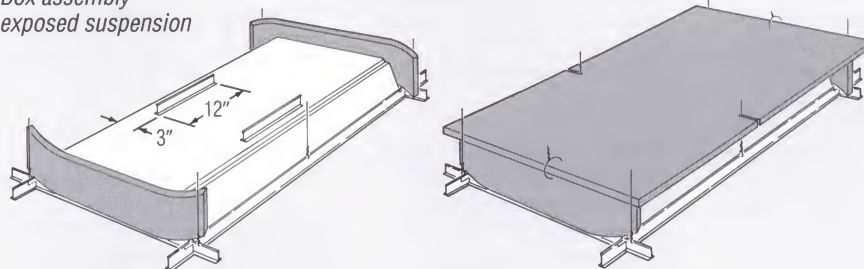
Sound Attenuation—Plenum sound barriers improve sound attenuation by reducing flanking sound.

For overlaid insulation, two installation methods are recommended: a single layer of 1½" THERMAFIBER sound attenuation fire blanket insulation (not shown) can be placed over the entire ceiling; or a double layer 1½" (or single layer 3") THERMAFIBER sound attenuation fire blanket insulation can be overlaid in a 4'-width along each side of partitions (see drawing).

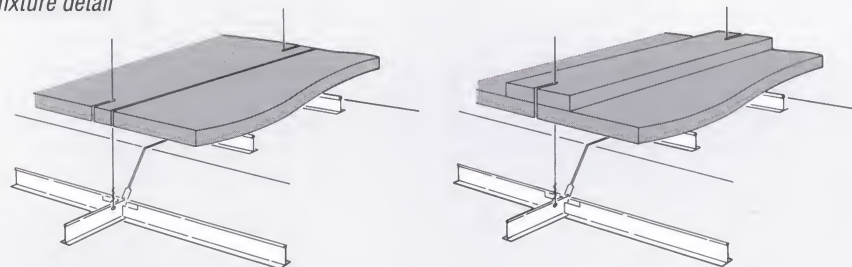
Formed semi-rigid insulation barriers offer greater acoustical efficiency and economy, making them preferred to overlaid insulation. Three types are available: vertical barrier; inverted "T" barriers; and tent barriers.

Light Fixture Protection for Fire-Rated Ceilings

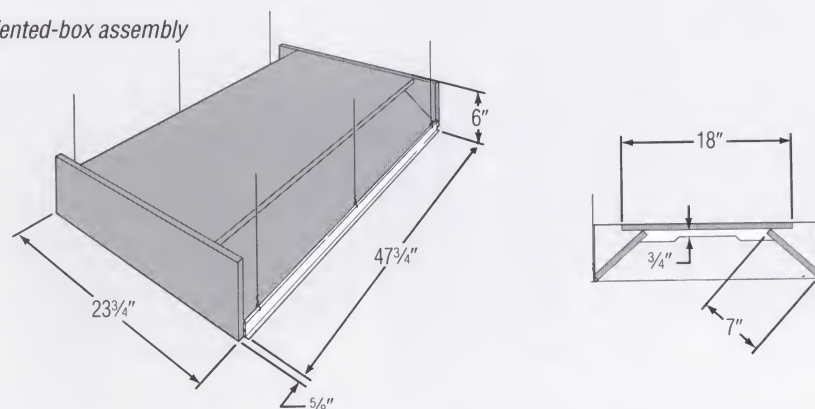
*Box assembly
exposed suspension*



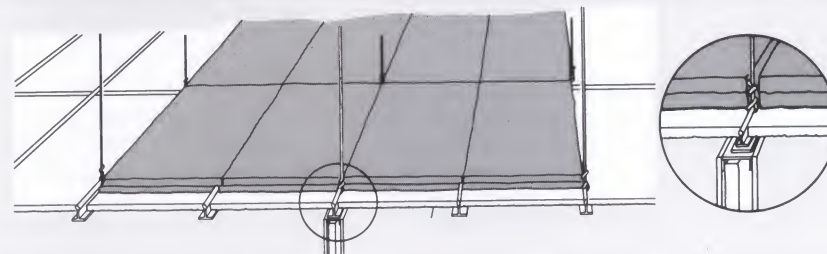
*Tandem light
fixture detail*



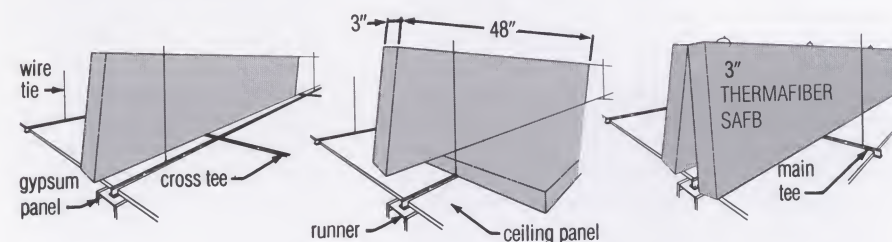
Vented-box assembly



Plenum sound barriers—field-fabricated from 3" thick, 2' x 4' THERMAFIBER sound attenuation fire blankets installed longitudinally. Field-cut 2' width as necessary to fit plenum depth, with 3" to 4" allowable clearance above blankets to maintain full sound attenuation effectiveness (test values). Check for adequacy of plenum air flow, if required.



Mounting CEd—STC's in the 40-44 range with 2' x 2' ACOUSTONE GLACIER panel or 2' x 4' AURATONE Fissured panel ceilings (illustrated, also see text and page 52 for individual product STC ranges).



Vertical barrier over partition

Inverted "T" barrier over partition

Tent barrier over partition

Product Limitations

Environmental Conditions—Do not use ACOUSTONE, AURATONE, or Gypsum Lay-In panels in 1) high humidity, 2) areas below wainscot height, or 3) areas otherwise exposed to impact, abrasion or tampering. These products are sized and designed for use within the standard occupancy range of temperature and humidity, 60°-85°F, no more than 75% RH (95°F/95% RH for PREMIER Glass Fiber and ORION panels; 90°F/90% RH for CERAMIC HERITAGE, SUPER-E, ECLIPSE and Corona 90 panels). Humidity can greatly affect product dimensional stability and sag resistance. Sag can become noticeable during periods of high humidity lasting only a few hours. For Gypsum Lay-In panels, provide ventilation in enclosed spaces above panels. Do not use ORION and ECLIPSE ceiling products, or PREMIER Nubby or HI-LITE glass fiber acoustical ceiling products where a concentration of chemical fumes is present, in areas exposed to impact or abrasion, in coolers or cold storage rooms or adjacent areas, above swimming pools, or where radiant temperature exceeds 140°F.

Special Environmental Requirements for Grid—Climatic conditions in areas to receive ceiling suspension systems shall range from 60°F (15.56°C) to 85°F (29.44°C) and relative humidity of not more than 70% shall be maintained before installation of components. For non-

fire-rated grid in high-humidity applications, use aluminum or ZXA suspension systems. For fire-rated applications, use ZXLA. For exterior applications, grid should be approved by manufacturer for outdoor use.

Installation—Install ACOUSTONE and AURATONE ceiling products under ambient conditions within the standard occupancy range, after residual moisture from plaster, concrete and terrazzo work has dissipated. Allow time for dimensional changes in those products stored at temperature/humidity conditions well outside of those recommended for service. With increases in temperature/humidity, ACOUSTONE and AURATONE panels expand (up to $\frac{1}{4}$ in/ft at 80°F/90% RH) and may not fit into a fixed grid. Conversely, with decreases, these products will be undersize, but expand to normal when standard ambient conditions return.

For some patterns, if perimeter panels must be cut smaller, the abutting edge must be field-rabbetted or the wall angle must be lowered $\frac{3}{8}$ ".

Foil-back ACOUSTONE tile should not be adhesively applied.

X2000/ECLIPSE products are sized and designed for use within the standard occupancy range of temperature and humidity, up to 90°F, no more than 90% RH.

ORION products are sized and designed for use up to 95°F and 90% RH.

Overlaid Material—Although ACOUSTONE and AURATONE products are sag-resistant, loading aggravates the tendency to sag. To prevent objectionable sag, limit overlaid insulation or other material to .75 lb/ft² maximum (3.50 lb/ft² maximum on SUPER-E products, .75 lb/ft² maximum on $\frac{1}{2}$ " ORION and ECLIPSE products, .25 lb/ft² maximum on $\frac{1}{2}$ " ORION and ECLIPSE products).

Fire-Rating—UL Design fire rating requires: (1) FIRECODE formulation products, (2) fire-rated suspension system, (3) entire ceiling installation as specified in UL Design, (4) ceiling be free of overlaid material not specified in the design.

Suspension System—For panels in exposed grids in high-humidity applications, use aluminum or hot dipped galvanized suspension systems. For exterior applications, suspension system should be approved by manufacturer. Grid tee deflection should be limited to $\frac{1}{8}$ " of span, maximum, for intended esthetics in ceiling applications.

Color Uniformity—Colors are checked by spectrophotometric analysis according to the "L.a.b." chromaticity coordinates system. Color-matching of coatings and fabrics is considered well within

normally accepted commercial tolerance.

Product Lots—Texture, room lighting and subjectivity of observer can affect perceived color. In any unbroken area of ceiling, all material should be used from the same product lot (indicated by lot number on each carton) to minimize the effect.

Fire Protection Accessory Limitations—Fire Rating. Fire ratings may be nullified by overlaid material unless material was specified in the UL Design.

Overlaid Weight. Possibility of sag in panels (see "Environmental Conditions" above) usually limits overlaid weight, but ceiling/suspension strength is another limiting factor.

10-Year Limited Warranty—USG Interiors, Inc. warrants its ORION and ECLIPSE ceiling panels and PREMIER glass fiber ceiling panels for 10 years from the date of installation against sagging, warping, shrinking or delamination of finished surfaces subject to normal, allowable manufacturing tolerances and further conditions. For details, contact your USG Interiors representative.

Good Design Practices

Storage Conditions—Ceiling material storage time at the jobsite should be as short as possible, and environmental conditions should be as near as possible to those specified for occupancy (see "Occupancy Conditions" below).

Excess humidity during storage can cause expansion of acoustical material and possible warp, sag or poor fit after installation. Chemical changes in the mat and/or coatings can be aggravated by excess humidity and cause discoloration during storage, even in unopened cartons. Cartons should be removed from pallets and stringers to prevent distortion of material. Long-term (6-12 months) storage under uncontrolled environmental conditions should be avoided.

Damaged or deteriorated materials should be removed from the premises. Immediately before installation, to stabilize tile and panels, store them at a location where

temperature and humidity conditions duplicate those ambient during installation and anticipated for occupancy.

Occupancy Conditions—These acoustical and suspension products are designed for installation and use under standard occupancy conditions of temperature and humidity (60°-85°F, no more than 75% RH).

Maintenance—Clean with a vacuum cleaner or chemical rubber sponge (used dry). White panels with optional plastic coating can also be washed with a mild detergent and water.

To repaint, spray a thinned, nonbridging vinyl-acrylic flat wall paint. Repaint plastic coated surfaces with a nonbridging vinyl-acrylic flat enamel or other nonbridging paint, properly formulated to retain natural semi-gloss appearance. The type of paint selected and the method of application can alter the acoustical

performance and fire ratings of any acoustical product. Therefore, USG Interiors cannot guarantee that the modified panels/tile will match the published performance.

Insulation—The roof deck above acoustical ceiling products must be properly vented and insulated, and incorporate a vapor retarder to prevent condensation and staining of the ceiling. Insulation blankets can be overlaid on the ceiling, so long as they do not exceed .75 lb/ft² (.25 lb/ft² for $\frac{1}{2}$ " ORION and ECLIPSE ceiling products), but under some conditions can cause objectionable panel sag. The space above must always be adequately ventilated to prevent moisture buildup in the insulation. In addition, overlaid material of any kind inhibits access through the ceiling, and nullifies an assembly's fire rating unless specified in the UL Design or locally approved.

Critical Lighting—Do not use square edge (SESK) tile in concealed systems for ceilings subjected to strong sidelighting. Strong sidelighting with slight angle of incidence to ceiling surface greatly exaggerates surface irregularities. It demands careful, precise installation to avoid job problems and owner complaints. Effects can be minimized by using bevel edge or rough surface patterns instead of smooth-surfaced or square edge units, or by employing an exposed suspension. Shadows often can be eliminated or softened with draperies or blinds. ACOUSTONE tile should be installed so that fissures run parallel to critical light source and fissure openings face away from the light source.

Ceiling Height—ACOUSTONE tile appearance is most even in 9' to 15' heights. Ceilings higher than 15' exaggerate natural texture variations.

Acoustical Performance Guide

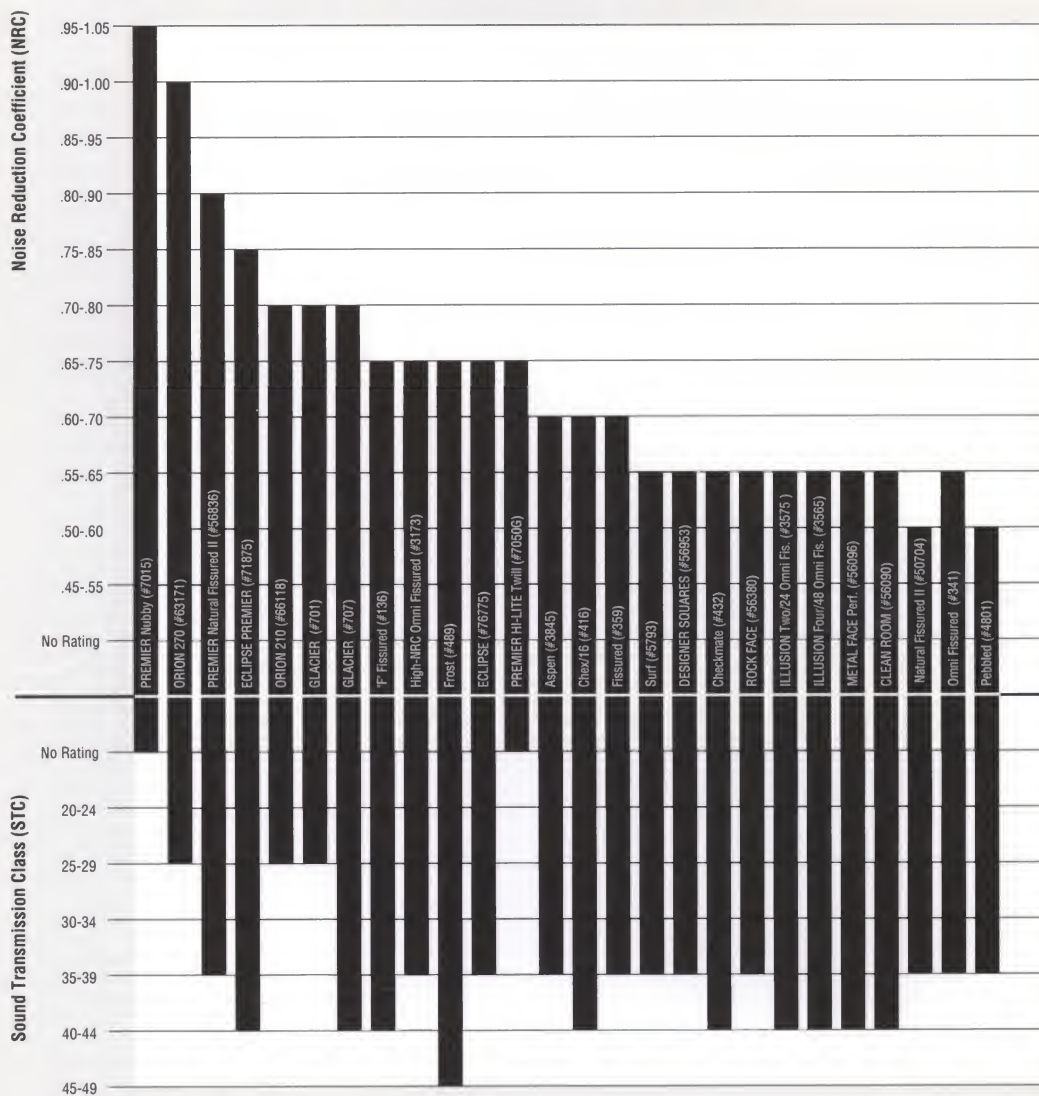
Direct Attachment of Tile—With existing drywall ceilings, direct staple-attachment is the easiest, most economical method, requiring only that the existing ceiling be a minimum 1/2" thick and in a flat plane without bumps or ridges, and that the tile have a suitable stapling flange. Double stapling with 3/8"-long divergent point staples is recommended. The adhesive attachment method, using an adhesive in accordance with ASTM D1779 or Federal Spec. MMM-A-00150B (GSA-FSS), is preferred when the existing drywall ceiling is not flat enough for direct stapling. **Only Class A tile can be adhesively applied.**

Apply tile with an adhesive manufactured specifically for this purpose, in accordance with adhesive manufacturer's directions, and/or as follows. Brush off any loose dust from tile back surfaces and prime them where adhesive is to be applied. This lays down any residual dust to assure good adhesion. Prime only a 2-3" circle near each corner by buttering a very thin coat of adhesive with trowel blade at a 45° angle. Then apply a walnut-sized dab of adhesive to each of the 4 circles and press tile firmly in place. Insert splines in kerfs at corners of units. **Foil backed ACOUSTONE tile should not be adhesively applied.**

Color/Texture/Dimension Uniformity—Variations in color and fissure size in acoustical ceiling products are natural; they are of small consequence within a batch but more obvious from batch to batch. Jobs should be planned so that material is ordered and shipped at one time. In accordance with industry practice, acoustical ceiling product dimensions are nominal.

Fire-Rating—To qualify for UL Design ratings, ceiling must include FIRECODE tile or panels, be constructed as described in the specified UL Design, include a fire-rated suspension system. It usually must be free of overlaid material such as insulation (see "Product Limitations").

System Performance—USG Interiors, Inc. will provide test certification for published fire, sound and structural data, covering systems designed and constructed



according to its published specifications. Tests are conducted on Company products to meet performance requirements of established test procedures specified by various agencies. System performance following any substitution of materials or compromise in assembly design cannot be certified and may result in failure under critical conditions.

For further information...

Customer Relations Centers

1-800-950-3839

USG Interiors, Inc. Area Sales Offices

South Pacific
500 North State College Blvd.
Suite 230
Orange, CA 92668
Office: (714) 978-0901
FAX: (714) 978-2579

Southwest
14643 Dallas Parkway
Suite 575, LB #78
Dallas, TX 75240
Office: (214) 490-0355
FAX: (214) 392-1505

Southeast
1000 Abernathy Road, N.E.
Suite 500
Atlanta, GA 30328
Office: (404) 396-9022
FAX: (404) 698-0769

Northeast
296 Temple Hill Road
Suite 100
New Windsor, NY 12553
Office: (914) 567-0059
FAX: (914) 567-0058

Mid-Atlantic
1155 Connecticut Ave., N.W.
Washington, DC 20036
Office: (202) 467-8592
FAX: (202) 467-4924

New York City
Office: (718) 937-7744
FAX: (914) 567-0058

Gulf Coast
5850 TG Lee Blvd.
Suite 310
Orlando, FL 32822
Office: (407) 851-9485
FAX: (407) 851-4434

Great Lakes
1000 Crocker Road
Westlake, OH 44145
Office: (800) 777-8744
FAX: (216) 892-7289

Chicago
1240 Iroquois Ave.
Suite 510
Naperville, IL 60563-8541
Office: (708) 355-7312
FAX: (708) 527-1841

Gateway
P.O. Box 4470
Chicago, IL 60680-4470
125 South Franklin Street
Chicago, IL 60606-4678
Office: (312) 606-4000
FAX: (312) 606-5490

North Pacific
7901 Stoneridge Drive
Suite 499
Pleasanton, CA 94566
Office: (510) 460-8470
FAX: (510) 460-8474

National Showroom

The Solutions Center
222 West Hubbard
Chicago, IL 60610
Office: (312) 822-3400

International Sales and Product Support

Australia
USG Interiors Australia (Pty.)
Limited
Building 3, 203
215 Woodpark Road
Smithfield NSW 2164
Australia
Office: 61-27253744
FAX: 61-27253331

Canada
CGC Interiors
735 Fourth Line Road
Oakville, Ontario
Canada L6L 5B7
Office: 1-800-387-7920
In Quebec, call 1-800-363-8844
FAX: 416-845-8819

France
Donn France S.A.
Z.I. Nord-B.P. 121
9, Rue des Livraindieres
28105 Dreux Cedex
France
Office: 33-37385050
FAX: 33-37469233

*Germany, Austria, Belgium,
Greece, Luxembourg, The
Netherlands, Switzerland*
Donn Products GmbH
Postfach 110245, Metallstrasse 1
4060 Viersen II
Mackenstein, Germany
Office: 49-2161-9570
FAX: 49-2162-4461

Italy
Donn Italia S.P.R.L.
Via Dante 144
20090 Limoto-Pioltello
Milan, Italy
Office: 39-2-92699601
FAX: 39-2-92699605

Latin America/Caribbean
USG Interiors International, Inc.
8511 N.W. 61st Street
Miami, FL 33166
Office: 305-599-9707
FAX: 305-599-9940

Mexico
Yeso Panamericano S.A. de C.V.
Providencia 334, 7th Floor
Col. del Valle
03100 Mexico, D.F.
Mexico
Office: 525-5437260
FAX: 525-6820876

Middle East/Africa
USG Interiors International, Inc.
125 South Franklin Street
P.O. Box 4470
Chicago, IL 60680-4470
Office: 312-606-5491
FAX: 312-606-5443

New Zealand
USG Interiors Pacific Ltd.
P.O. Box 11-155
6 Monier Place, Mt. Wellington
Ellerslie
Auckland, New Zealand
Office: 64-95795601
FAX: 64-95796859

Southeast Asia
USG Interiors Far East SDN BHD
43 & 45, 2nd Floor
Jalan SS 15/4
Subang Jaya
47500 Petaling Jaya
Selangor, Malaysia
Office: 60-37338980
FAX: 60-37344267

Spain
Donn Iberica
Valportillo Segunda, 14
28100 Alcobendas
Madrid, Spain
Office: 34-1-661-71-09
FAX: 34-1-661-71-08

*Sweden, Norway, Denmark,
Finland, Iceland, Russia*
Donn Scandinavia
Box 7123
S-191 07 Sollentuna
Sweden
Office: 46-8-754-9360
FAX: 46-8-626-9451

United Kingdom/Ireland
Donn Products U.K. Ltd.
1 Swan Road
South West Industrial Estate
Peterlee
Co. Durham SR8 2JJ
England
Office: 44-9-1586-1121
FAX: 44-9-1586-0097

United States
USG Interiors International, Inc.
125 South Franklin Street
P.O. Box 4470
Chicago, IL 60680-4470
United States
Office: 312-606-5840
FAX: 312-606-5443

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Metric Specifications—USG Corporation, through its operating subsidiaries, will provide metric conversions on its products and systems to help specifiers match metric design sizes. In addition, some products are available in metric dimensions from selected manufacturing plants. For acoustical and suspension products, add an "ME" before the standard item number to order the metric equivalent. Refer to *SA-100 Construction Selector* for additional information and a Table of Metric Equivalents.

Innovation within, value throughout™

USG Interiors, Inc.
125 South Franklin Street
P.O. Box 4470
Chicago, IL 60680-4470

**I N T E G R A T E D
C E I L I N G S**

Specialty Products

S A 9 0 6

USG Interiors, Inc.



USG

INTEGRATED CEILINGS™ Specialty Products

USG Interiors, Inc. is proud to offer the industry's most innovative resource of specialty ceiling designs. Developed for unique architectural settings, our specialty ceilings transform open ceiling planes into spectacular, artistic spaces. Complete ceiling systems come to the jobsite pre-engineered, fitted, painted and ready to install.

Dozens of options are available, including luminous skylights, elegant reflective surfaces, floating island ceilings, fabric-wrapped ceilings and walls, open plenum treatments and acoustical linear metal. Specialty materials include acrylic "glass block" panels and reinforced gypsum panels.

Table of Contents

Cover: CELEBRATION ceiling.

Color photographs in this brochure show colors that are as close as possible to actual products. For exact finishes, see product samples offered by your USG Interiors sales representative.

3	TRANSPARENCIES Ceilings
3	PANZ Ceiling Panels
4	COMPASSO Suspension Trim
6	GRIDWARE Open-Cell Ceilings
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16	SILENT Walls
17	SILENT BAFFLES and SILENT TOUCHES
18	DONN® COORDINATOR® Ceilings
19	SKYLITE Ceilings
19	QUADRADOME® Ceilings
19	ROTUNDA® Ceilings



TRANSPARENCIES ceilings. Four designs are available (clockwise from top left): Ice Cube, Melting Ice, Crushed Ice and Icicle.



TRANSPARENCIES Ceilings

TRANSPARENCIES panels give the same subtly refracted light play as traditional glass blocks, but with just a fraction of the weight, cost, and installation difficulties of glass. Lightweight, acrylic TRANSPARENCIES ceiling panels fit into a texturized exposed DONN suspension system for easy lay-in installation. Panels may be easily removed for cleaning or relamping without the use of tools.

Standard designs:

TRANSPARENCIES 100 (Crushed Ice pattern), TRANSPARENCIES 200 (Icicle pattern), TRANSPARENCIES 300 (Ice Cube pattern), TRANSPARENCIES 400 (Melting Ice pattern).

Standard size: 2'x2' panels.

PANZ Ceiling Panels

PANZ Ceiling Panels provide a no-nonsense ceiling solution that combines durability, cleanability, sound control and accessibility, all at a reasonable cost. Featuring the strength and economy of steel, PANZ panels are produced to exacting manufacturing tolerances. They interface precisely with DONN DX and CENTRICITEE suspension systems to provide a finished ceiling with crisp architectural detailing at the reveals. When used with DONN FINELINE suspension, they give the ultimate in monolithic appearance as well as accessibility.

Standard finishes: Smooth or perforated. Perforated has integral acoustical backer to achieve a .65 NRC.

Standard colors: White, Silver Satin, Mist, Manila, Taupe and Sandstone.

Standard size: 2'x2' panels, 600x600 mm panels.



PANZ ceiling panels.

For TRANSPARENCIES ceilings, it is recommended that fluorescent strip fixtures be placed a minimum of 18" above the ceiling and 18" o.c. for best results.

TRANSPARENCIES ceilings.

COMPÄSSO Suspension Trim

COMPÄSSO suspension trim allows the creation of free-form ceiling islands or facias incorporating standard DONN grid and ACOUSTONE® or AURATONE® panels.

You can design the islands or facias using virtually any combination of standard COMPÄSSO components (see below). Standard components are available in both inside (concave) and

outside (convex) radii in predetermined arc lengths as well as straight 10' lengths. 4", 8" and 2¼" trim styles are offered. COMPÄSSO promises all the benefits of acoustical suspension systems—sound control, accessibility, and the use of lay-in fixtures not available with drywall soffits.

Standard COMPÄSSO Curves

Radius	Arc (Included Angle)					
	15°	30°	45°	60°	90°	180°*
12'			•	•	•	•
18'			•	•	•	•
24'			•	•	•	
36'			•	•	•	
48'			•	•	•	
72'			•	•	•	
96'			•	•		
144'		•				
288'	•	•	•			

* Inside radii only. These components are used to create cut-out holes.



COMPÄSSO suspension trim with acoustical ceiling panels.

The finished design as specified by the architect is supplied in kit form with shop drawings for easy field assembly.

COMPÄSSO trim is available in 24 USG Interiors Color Solutions colors and eight contrasting finishes coordinating with standard ACOUSTONE and AURATONE panels and DONN grid. COMPÄSSO trim is also available in any custom color.



COMPÄSSO suspension trim with GRIDWORKS ceiling.

GRIDWARE Open-Cell Ceiling Systems

DONN suspension systems, with the unnecessary punching removed and painted on all surfaces, provide a fresh approach to open-cell plenum masks. Choose from nine combinations that produce unique visual designs using three face widths. Our proprietary grid-curve technology adds even more exciting possibilities for open

cell solutions at a reasonable cost. And because GRIDWARE has all the features of conventional suspension systems, lay-in light fixtures and air diffusers are readily adaptable.

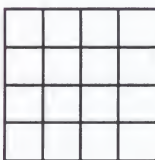
Standard profiles:

DX ($1\frac{5}{16}$ "), DXT ($\frac{9}{16}$ ") and DXW ($1\frac{1}{2}$ ")

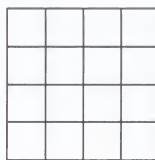
GRIDWARE ceilings.



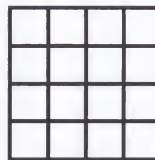
GWCOMBO



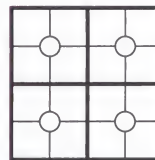
GWDX



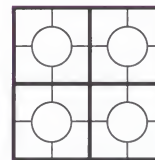
GWDXT



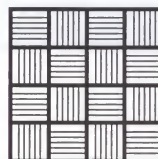
GWDXW



GWR1



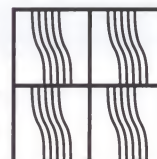
GWR2



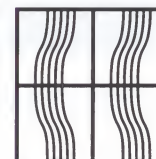
Parquet



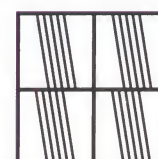
Ramma



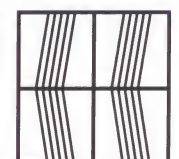
Stagger



Wiggle



Sawtooth



Herringbone

WIREWOKS Ceiling Panels

This great new open-cell ceiling solution, inspired by the unique technology of robotic wire welding, provides a clean, high tech look which easily accommodates signage, lighting and merchandising. WIREWOKS panels lay into standard DONN suspension systems and are equally effective in new or retrofit applications.

When combined with GRIDWARE open-cell ceilings and COMPASSO trim systems, WIREWOKS ceilings offer endless design possibilities.

Standard size: 2'x2' panels.

SPACECUBE Ceiling System

The SPACECUBE open-cell system brightens ceiling areas while allowing existing lighting and HVAC to filter through. Economical 2'x4' modified CENTRICITEE suspension system disappears into the continuous louver design. Looks great even after repeated access.

WIREWOKS open-cell ceiling panels.



SPACECUBE ceiling.



CADRE Reinforced-Gypsum Coffered Panels

CADRE reinforced-gypsum panels recreate the turn-of-the-century artistry of molded plaster ceilings and traditional wood ceilings. Timeless designs range from classic, simple coffers to ornate styles featuring intricately carved medallions. All CADRE panels offer the fire-resistant safety of gypsum and easy lay-in installation into standard DONN DX® grid.

Flame spread/smoke developed: 0/0.
Standard designs: Classic Coffer, Egg & Dartflower, Egg & Dartflower Classic, Traditional III, Traditional III Quartered, Dentil Coffer, Sanibel Shell, Captiva Rose, Barrel Edge Coffer.
Colors: White, 24 standard colors, custom colors.
Standard woodgrains: Natural Oak, Pearl Oak, Walnut and Mahogany.
Standard size: 2'x2' panels.
Nonstandard sizes: 1'x1', 1'x2', diagonal and truncated panels.



27360



27370



27380



27390



27410



Contemporary white CADRE reinforced-gypsum panels.

QUADRA Reinforced-Gypsum Coffers

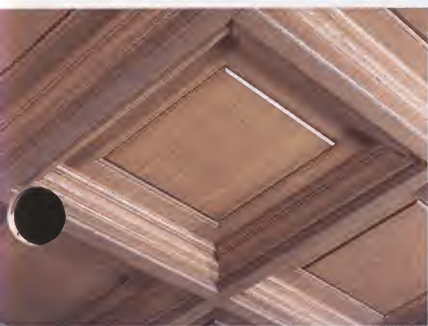
Classic QUADRA ceiling coffers accommodate a choice of acoustical panels without the need for rabbeting or special tools. The single-structure design eliminates a costly and time-intensive field assembly process as is required with other coffered systems. QUADRA ceiling coffers offer the fire-resistant safety of gypsum and easy lay-in installation into standard DONN DX or CENTRICITEE grid.

Flame spread/smoke developed: 0/0.
Standard designs: Crown and Cove coffers.

Colors: White, 24 standard colors, custom colors.

Standard woodgrains: Natural Oak, Pearl Oak, Walnut and Mahogany (Cove coffer only).

Recommended acoustical panels: ACOUSTONE Frost, ECLIPSE, ORION 270.



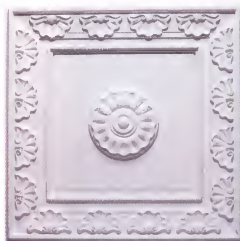
Woodgrain CADRE coffers.



White QUADRA coffers.



27420



27440



27570



27430



27510



27650

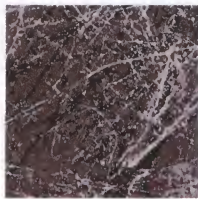
CELEBRATION Ceilings

Sophisticated CELEBRATION panels of painted, anodized, natural and new faux finishes are dramatically space extending, making rooms seem longer and wider. Painted CELEBRATION panels create clean-lined, contemporary ceilings. All CELEBRATION ceilings combine great looks with the hidden strength of metal.

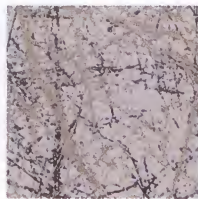
CELEBRATION panels easily snap into standard DONN FINELINE grid. The finished CELEBRATION ceiling presents an elegant graphic design with panels that seem to float within the reveal surrounding them. Panels can be easily removed for fast access to the plenum. See your USG Interiors sales representative for the complete offering of finishes.



Shadow Brushed



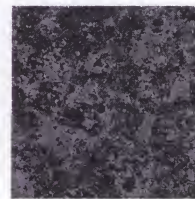
Etched Ice Dark



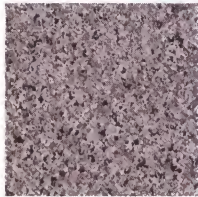
Etched Ice Light



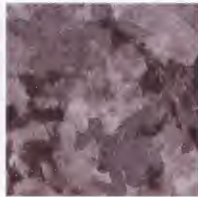
Aged Copper



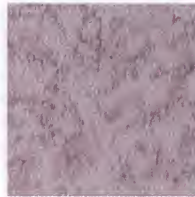
Tarnished Silver Dark



Light Granite



Regal Grey Granite



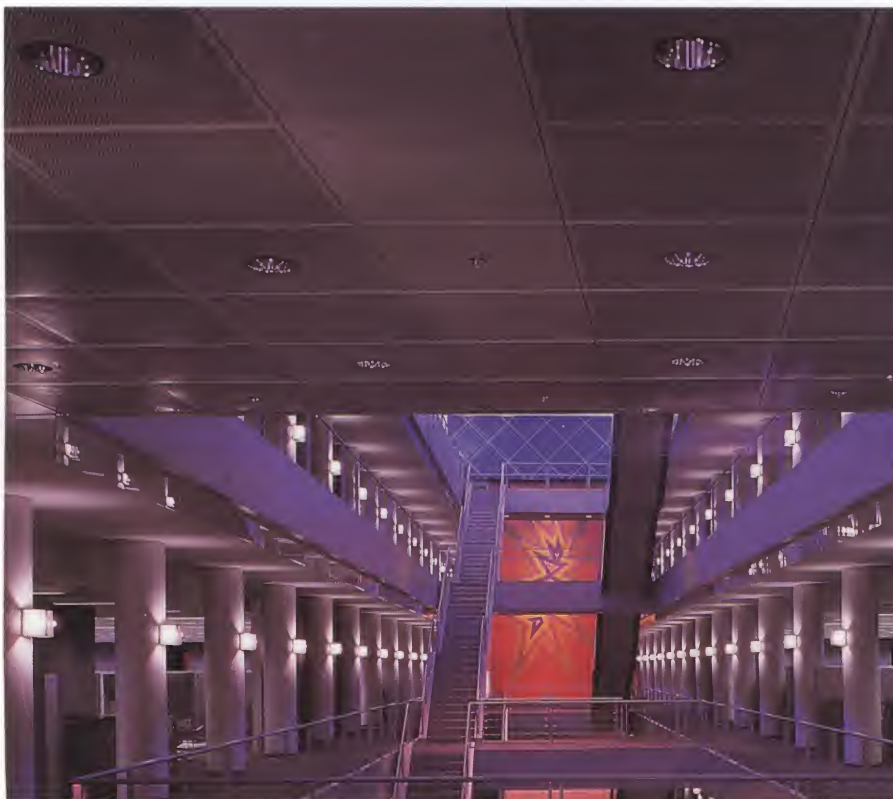
Silver



Pewter



Marble



Satin-finish CELEBRATION ceiling.

Anodized reflective finishes: polished brass, and chrome, smoke and brass colors in satin finish.

Painted finishes: smooth or perforated panels in CELEBRATION White or any USG Interiors Color Solutions color.

Natural metal finishes: spangled galvanized, classic stainless, shadow brushed, etched ice dark, etched ice light, aged copper, tarnished silver dark, light granite, regal grey granite.

Vinyl to metal patinas: silver, pewter, marble.

Panels are available in the following sizes: 2'x2', 30"x30", 1'x4', 1'x1'.



Stylized CELEBRATION ceiling incorporating 1'x1', 1'x4' and 2'x2' panels.



Silver satin finish CELEBRATION ceiling.

PARALINE Ceilings

Elegant, imaginative linear metal ceilings with clean, crisp lines. PARALINE ceilings are ideal for vast, expansive areas and can be curved to change the dimension of the ceiling plane. UL-tested 2-hour and 3-hour fire ratings are available.

Three styles are offered. PARALINE I and PARALINE III pans feature open reveals that will take advantage of acoustical material in the plenum; NRC ratings are available on request. Closed reveal PARALINE II pans are appropriate for exterior ceiling applications under protected soffits as well as interior applications. For more information, see detailed PARALINE literature offered by your sales representative.

Type of metal: steel or aluminum (PARALINE I and II), aluminum (PARALINE III).

Style: perforated or unperforated (PARALINE I and II), unperforated (PARALINE III).

Standard colors: six standard paint colors, plus custom colors.

Metallic finishes: polished aluminum, polished smoke, polished brass, brushed aluminum (PARALINE I and II only).

Texturized finish: available on PARALINE I and II only.

Standard sizes: $\frac{3}{4}$ " x $3\frac{1}{4}$ " x 12' (PARALINE I and II), $\frac{3}{4}$ " x $7\frac{1}{4}$ " x 12' (PARALINE III).



PARALINE ceilings.

LINEA Baffles Ceilings

LINEA roll-formed aluminum baffles create a one-directional open-plenum linear ceiling. Baffles attach to a heavy-duty 4'x4' flat black DX suspension system with a clip that allows easy removal to access services above. Attachment clips provide for any alignment of baffles to the grid for unlimited design possibilities. Ideal for remodel work by attaching LINEA baffles to existing $15/16$ " grid.

Standard finish: off-white (custom finishes also available).

Standard sizes: 6", 8", and 12" baffles all in 12' lengths.

LINEA baffles.



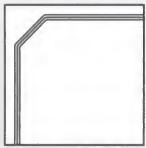
RENDITIONS Computer-Generated Ceilings

RENDITIONS ceilings combine your unique face-routed ceiling design with beautiful light texture. Choose from the standard "Border Designs" or provide your custom designs to your USG Interiors sales representative.

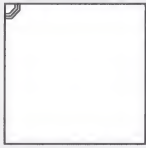
Surface texture: ACOUSTONE Frost, ECLIPSE, X2000.

Colors: White, 24 standard colors, custom colors.

Standard size: 2'x2' panels.



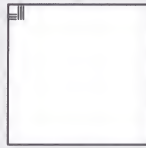
RENDITIONS I (A)



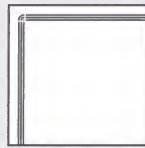
RENDITIONS I (B)



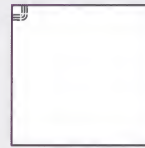
RENDITIONS II (A)



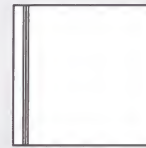
RENDITIONS II (B)



RENDITIONS III (A)



RENDITIONS III (B)



Straight Line



Custom RENDITIONS ceiling.

RENDITIONS I ceiling.

Virtually any custom design, including company logos or trademarks, can be produced. These designs may cross grid lines, providing a dominant, dramatic appearance. Or use one of our standard patterns to create visual flow through the ceiling plane.



SILENT EXPRESSIONS and SILENT SQUARES Ceilings

SILENT EXPRESSIONS custom-embossed panels using your exclusive design can express a subtle reference to a company image or a bold monogrammed statement. Four tasteful designs are also offered as standard patterns. Panels are installed into conventional exposed suspension systems.

Standard designs:

EXPRESSIONS I, II, III, IV.

Standard fabrics: Six nonwoven fabric colors.

Edge: Radius Reveal.

Standard size: 2'x2' panels.

SILENT EXPRESSIONS III ceiling.



SILENT SQUARES panels offer an exclusive combination of luxury and efficient sound control. Panels are installed into DONN exposed suspension systems in matching or contrasting colors.

Standard fabrics: Nine fabric lines in dozens of colors.

Edges: Radius Reveal, Interline Square, Interline Radius.

Standard size: 2'x2' panels.



SILENT EXPRESSIONS I, II, III and IV.

SILENT SQUARES ceiling.



SILENT Wall Panels

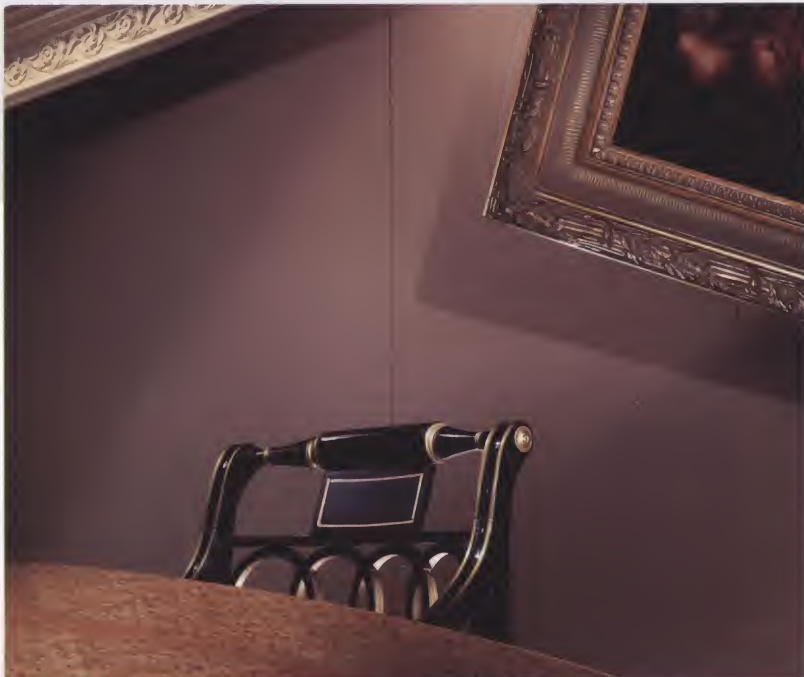
Fabric and vinyl-covered SILENT wall panels install easily on existing masonry walls or on gypsum drywall. Acoustical performance, based on a combination of these surfaces (vinyl or fabric) on mineral board or fiberglass substrate, can be specified to meet your unique requirements.

Consult THE SILENT COLLECTION technical data for specific acoustical values.

Standard finishes: Nine fabric and six vinyl lines in dozens of colors.

Standard sizes: 30"x9', 30"x10'.

**Fabric-covered
SILENT wall panels.**



**Vinyl-covered
SILENT wall panels.**



SILENT BAFFLES

SILENT BAFFLES add interest to the ceiling above and define floor space below.

Standard fabrics: Six nonwoven fabric colors.

Standard widths: 12" to 48" in 6" increments.

Standard lengths: 1' to 8'.

SILENT TOUCHES Wall Appliqués

Sound-absorbing SILENT TOUCHES enhance wall surfaces.

Standard fabrics: Nine fabric lines in dozen of colors.

Standard vinyls: Six styles in dozen of colors.

Standard widths: 12" to 48" in 6" increments.

Standard lengths: 1' to 8'.



SILENT BAFFLES.



SILENT TOUCHES.

DONN COORDINATOR Ceilings

The DONN COORDINATOR ceiling system gives maximum flexibility to architectural planning. Lighting, air distribution, acoustical control, and partition attachment have been harmoniously integrated to provide an efficient modular ceiling system with desirable esthetic qualities.

The unique design of the COORDINATOR runner permits installation, removal and relocation of partitions as well as provisions for HVAC and sprinkler utilities. Four modular designs are offered: coffered, pyramid, flat and one-directional.

DONN COORDINATOR modules.



Luminous Products

INTEGRATED CEILINGS luminous products make up a unique offering of luminous skylights and other decorative ceiling systems that complete our line of specialty products. These systems are engineered to your stringent requirements and delivered with complete shop drawings for fast, error-free field assembly and installation.

INTEGRATED CEILINGS luminous products are designed and manufactured to order by trained factory personnel. This cooperative process transforms your unique architectural requirements into complete ceiling solutions that define the space to your exact needs. For more information, contact your USG Interiors, Inc., representative.



ROTUNDA Ceilings

An ingeniously designed dome support system. Grid members can be joined from as many as eight different directions. ROTUNDA domes can be installed either concave or convex.

QUADRADOME Ceilings

Flat panels join together for a simple, highly graphic design. Or the QUADRADOME module can be raised above the ceiling line with attached riser panels to form a skylight. QUADRADOME skylights can be installed to be either concave or convex. The lightweight extruded aluminum grid assembly is suspended by hanger wires.

SKYLITE Ceilings

SKYLITE ceilings offer the beauty of a natural skylight, providing the warmth and brightness of daylight. Lightweight extruded aluminum grid members can be formed into square, rectangular or triangular shapes. Light is provided from above the SKYLITE by inexpensive fluorescent strip fixtures.



For further information . . .

Customer Relations Centers

1-800-950-3839

Area Sales Offices

South Pacific
500 North State College Blvd.
Suite 230
Orange, CA 92668
Office: (714) 978-0901
FAX: (714) 978-2579

Southwest
14643 Dallas Parkway
Suite 575, LB #78
Dallas, TX 75240
Office: (214) 490-0355
FAX: (214) 392-1505

Southeast
1000 Abernathy Road, N.E.
Suite 500
Atlanta, GA 30328
Office: (404) 396-9022
FAX: (404) 698-0769

Mid-Atlantic
1155 Connecticut Ave., N.W.
Washington, DC 20036
Office: (202) 467-8592
FAX: (202) 467-4924

Northeast
296 Temple Hill Road
Suite 100
New Windsor, NY 12553
Office: (914) 567-0059
FAX: (914) 567-0058

New York City
Office: (718) 937-7744
FAX: (914) 567-0058

Gulf Coast
5850 TG Lee Blvd.
Suite 310
Orlando, FL 32822
Office: (407) 851-9485
FAX: (407) 851-4434

Great Lakes
1000 Crocker Road
Westlake, OH 44145
Office: (800) 777-8744
FAX: (216) 892-7289

Chicago
1240 Iroquois Ave.
Suite 510
Naperville, IL 60563-8541
Office: (708) 355-7312
FAX: (708) 527-1841

Gateway
P.O. Box 4470
Chicago, IL 60680-4470
125 South Franklin Street
Chicago, IL 60606-4678
Office: (312) 606-4000
FAX: (312) 606-5490

North Pacific
7901 Stoneridge Drive
Suite 499
Pleasanton, CA 94566
Office: (510) 460-8470
FAX: (510) 460-8474

National Showroom

The Solutions Center
222 West Hubbard
Chicago, IL 60606
Office: (312) 822-3400

International Sales and Product Support

Australia
USG Interiors Australia (Pty.) Limited
Building 3, 203-215
Woodpark Road
Smithfield NSW 2164
Australia
Office: 61-27253744
FAX: 61-27253331

Canada
CGC Interiors
735 Fourth Line
Oakville, Ontario
Canada L6L 5B7
Office: 1-800-387-7920
In Quebec, call 1-800-363-8844
FAX: 416-845-8819

France
Donn France S.A. Z.I. Nord
Rue des Livraindieres
28100 Dreux
France
Office: 33-37385050
FAX: 33-37469233

Germany, Austria, Belgium, Greece, Luxembourg, The Netherlands, Switzerland
Donn Products GmbH
Postfach 110245, Metallstrasse 1
4060 Viersen II
Mackenstein, Germany
Office: 49-2161-9570
FAX: 49-2162-4461

Italy
Donn Italia S.P.R.L.
Via Dante 144
20090 Limito-Tioltello
Milan, Italy
Office: 39-2-92699601
FAX: 39-2-92699605

Latin America/Caribbean
USG Interiors International, Inc.
8511 N.W. 61st Street
Miami, FL 33166
Office: 305-599-9707
FAX: 305-599-9940

Mexico
Yeso Panamericano S.A. de C.V.
Providencia 334, 7th Floor
Col. del Valle
03100 Mexico, D.F.
Mexico
Office: 525-5437260
FAX: 525-6820876

Middle East/Africa
USG International, Inc.
125 South Franklin Street
P.O. Box 4470
Chicago, IL 60680-4470
Office: 312-606-5491
FAX: 312-606-5443

New Zealand
USG Interiors Pacific Ltd.
P.O. Box 11-155
6 Monier Place, Mt. Wellington
Ellerslie
Auckland, New Zealand
Office: 64-95795601
FAX: 64-95796859

Southeast Asia
USG Interiors Far East SDN BHD
43 & 45, 2nd Floor
Jalan SS 15/4
Subang Jaya
47500 Petaling Jaya
Selangor, Malaysia
Office: 60-37338980
FAX: 60-3734426

Spain
Donn Iberica
Valportillo Segunda, 14
28100 Alcobendas
Madrid, Spain
Office: 34-1-661-71-09
FAX: 34-1-661-71-08

Sweden, Norway, Denmark, Finland, Iceland, Russia
Donn Scandinavia
Box 7123
S-191 07 Sollentuna
Sweden
Office: 46-8-754-9360
FAX: 46-8-626-9451

United Kingdom
Donn Products U.K. Ltd.
1 Swan Road
South West Industrial Estate
Peterlee
Co. Durham SR8 2JJ England
Office: 44-9-1586-1121
FAX: 44-9-1586-0097

United States
USG Interiors International, Inc.
P.O. Box 4470
125 South Franklin Street
Chicago, IL 60680-4470
United States
Office: 312-606-5840
FAX: 312-606-5443

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Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

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SILENT BAFFLES, SILENT, SILENT EXPRESSIONS, SILENT SQUARES®, SILENT TOUCHES, SKYLITE, SPACECUBE®, TRANSPARENCIES, WIREWORKS.

Metric Specifications

USG Interiors, Inc. will provide metric conversions on its products and systems to help specifiers match metric design sizes. In addition, some products are available in metric dimensions from selected manufacturing plants. Refer to SA-100 Construction Selector for additional information and a Table of Metric Equivalents.

Innovation within, value throughout.™

USG Interiors, Inc.
Dept. 321-2
125 South Franklin Street
P.O. Box 4470
Chicago, IL 60680-4470

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Drywall/Steel Framed Systems



For interior applications and exterior curtain wall assemblies

USG

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NOTICE: Steel studs, runners and accessories in this catalog are marketed by United States Gypsum Company as integral components of its gypsum board systems. Upon request, United States Gypsum Company will provide certification that these products conform to the applicable Company and ASTM standards as well as meet the performance values identified herein. Refer to framing manufacturer's technical information for specific data on steel framing components.

The material contained in this catalog concerning steel framing systems including, but not limited to test data, technical data, details, specifications and Good Design Practices, portray construction methods in use at time this catalog went to press. They are not intended to replace or supersede specific specifications and construction documents for a given building.



Partitions

Description

These lightweight, fire and sound-resistant assemblies consist of SHEETROCK brand Gypsum Panels screw-attached to steel framing. A specially designed self-tapping steel screw with rust inhibitive coating attaches panels to framing. The systems are completed with a United States Gypsum Company joint system and decorating—both steps unnecessary in walls when pre-decorated TEXTONE Vinyl-Faced Gypsum Panels are used.

Systems using SHEETROCK brand Gypsum Panels, FIRECODE Core, or ULTRACODE Core, obtain higher fire ratings than regular gypsum panels (see page 4). Panels are applied to steel studs, RC-1 Resilient Channels (part of the family of SHEETROCK Metal Products) or metal furring channels to meet design requirements for fixed interior partitions.

Single-Layer Partitions—Single-layer $\frac{5}{8}$ " SHEETROCK brand Gypsum Panels, FIRECODE Core, applied to steel studs, set in runners, provide economical 1-hour fire-rated partitioning for corridors or within units. Exclusive creased THERMAFIBER Sound Attenuation Fire Blankets (SAFB) systems offer 51 to 55 STC ratings and 1-hour fire ratings at the lower in-place costs of single-layer assemblies. A 1-hour rating is also available with $\frac{1}{2}$ " thick panels and 1 $\frac{1}{2}$ " THERMAFIBER SAFB installed in the stud cavity.

The new $\frac{3}{4}$ " SHEETROCK brand Gypsum Panels, ULTRACODE Core, provide a 2-hr. fire rating with single-layer construction when UL Design U491 is specified. Panels are attached to $\frac{3}{16}$ " min. steel studs and 3" thick THERMAFIBER SAFB is installed in the cavity. The system has a 50 STC.

Double-Layer Partitions—Double-layer $\frac{1}{2}$ " SHEETROCK brand Gypsum Panels, FIRECODE C Core, attached to 2 $\frac{1}{2}$ " or min. studs spaced 24" o.c. provide a 2-hour fire rating plus sound control suitable for party walls.

SHEETROCK brand Gypsum Panels, ULTRACODE Core, provide a 4-hr. fire rating with double-layer construction when UL Design U490 is specified. Panels are attached to 2 $\frac{1}{2}$ " steel studs and 2" thick THERMAFIBER SAFB is installed in the cavity. The system has a 56 STC.

In addition, two layers of $\frac{3}{4}$ " ULTRACODE Core panels may be substituted for three layers of $\frac{1}{2}$ " FIRECODE C Core panels in both UL Design U435 and UL Design U436 and still achieve the 3-hr. fire-resistance rating.

Multi-layer Partitions—Multi-layer $\frac{1}{2}$ " SHEETROCK brand Gypsum Panels, FIRECODE C Core, assemblies offer 3- and 4-hour fire ratings and up to 62 STC, yet are much lighter weight and thinner than concrete block. These assemblies also provide a 3-hour fire-resistant enclosure for steel trusses in staggered truss systems. Where added partition width is required, double rows of studs are erected to provide chase walls with up to 20 $\frac{3}{4}$ " net pipe chase width (see page 6). For high-attenuation partitions to isolate low-frequency noise, see page 7.

Shaft Walls—Gypsum panels, assembled with gypsum shaft wall liner and specially shaped USG C-H Studs, offer systems ideally suited for enclosing elevator shafts, stairwells and other vertical shafts in core areas of multi-story buildings (see separate *USG Cavity Shaft Wall Systems SA-926* for applications).

Function and Utility

When properly selected and constructed in a workmanlike manner, systems are adaptable to virtually every type of new construction—commercial, institutional, industrial and residential—or in modernization to provide smooth, durable interior surfaces.

Fire Resistant—Established fire ratings available to meet design requirements; partitions up to 4 hours, ceilings up to 3 hours, beam and column fireproofing up to 4 hours.

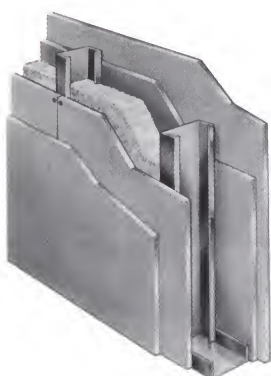
Sound Isolation—STC ratings up to 62 for multi-layer, 55 for double-layer and 55 for single-layer resilient partitions; 54 for single-layer ceilings. THERMAFIBER SAFB improve sound control.

Lightweight—These thin, drywall assemblies weigh only 5 to 17 psf, reduce dead load and save floor area.

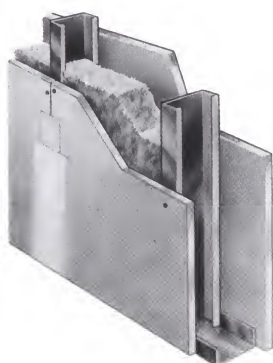
Economical—Low material cost and speed of erection provide realistic and competitive construction costs.

Limitations

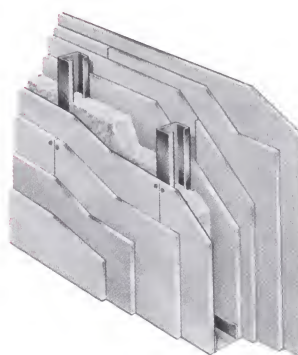
- 1 Non-load bearing.
- 2 Exposure to excessive or continuous moisture and extreme temperatures should be avoided.
- 3 Maximum frame spacing is 24" o.c., exception: when single-layer ceiling panels are applied with long edges parallel to joists and used as a base for spray-applied texture finish, max. frame spacing is 16" o.c.
- 4 In ceiling design, certain precautions concerning construction, isolation and ventilation are necessary for good performance (see Good Design Practices, page 31).



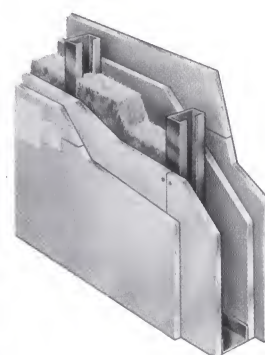
UL Des. U412
2-hour
2 layers FIRECODE C Core



UL Des. U491
2-hour
1 layer ULTRACODE Core



UL Des. U435
4-hour
4 layers FIRECODE C Core



UL Des. U490
4-hour
2 layers ULTRACODE Core

Screw locations and spacing—fire-rated steel stud drywall partitions

Test number	Face layer application			Base layer application			
	Screw			Screw			
	Length	Type	Spacing and location	Length	Type	Position	Spacing and location
UL Des U491	1 1/2"	S	8" o.c. to studs at joints, 12" o.c. to studs in field				
U of C 6/15/65	1 1/2"	S	12" o.c. to studs at joints and in field, 12" o.c. to runners	1"	S		12" o.c. to studs at joints and in field, 12" o.c. to runners
UL Des U411-2 hr.	1 1/2"	G	adhesive lamination ⁽¹⁾ and supplementary screws	1"	S		8" o.c. to studs at joints, 12" o.c. to studs in field
UL Des U411-2 hr.	1 1/2"	S	16" o.c. to studs at joints and in field, 12" o.c. to runners	1"	S		16" o.c. to studs at joints and in field
UL Des U412-2 hr.	1 1/2"	G	adhesive strip lamination ⁽¹⁾ and supplementary screws	1"	S		12" o.c. to studs at joints and in field
UL Des U412	1 1/2"	S	12" o.c. to studs at joints and in field	1"	S		12" o.c. to studs at joints and in field
U of C 9/21/64							
UL Des U420	1 1/2"	S	8" o.c. to studs at joints, 12" o.c. to studs in field	1"	S		8" o.c. to studs at joints,
GA-WP-1548	1 1/2"	S	12" o.c. to studs and 24" o.c. to runners	1"	S		24" o.c. to studs at joints and in field
UL Des U435-3 hr.	2 1/4"	S	12" o.c. to studs	1"	S	1st layer	48" o.c. to studs ⁽²⁾
UL Des U435-4 hr.	2 1/2"	S	12" o.c. to studs	1 1/2"	S	2nd layer	
	1 1/2"	G	between studs at horizontal joints	2 1/4"	S	3rd layer	
UL Des U436-2 hr.	1 1/2"	S	12" o.c. to studs	1"	S	1st layer	12" o.c. to studs
UL Des U436-3 hr.	2 1/2"	S	12" o.c. to studs	1 1/2"	S	2nd layer	
	1 1/2"	G	24" o.c. between studs at horizontal joints				
T-3362 OSU	1"	S	12" o.c. to studs at joints and runners, 8" o.c. to studs in field				
T-1174 OSU							
U of C 7/31/62							
GA-WP-1200							
UL Des U451-1 hr.	1"	S	12" o.c. to studs at joints and in field				
UL Des U490-4 hr.	2 1/4"	S	24" o.c. to studs	1 1/2"	S		24" o.c. to studs at joints and in field
	1 1/2"	G	24" o.c. between studs at horizontal joint				

(1) Use SHEETROCK Setting-Type (DURABOND) or Lightweight Setting Type (EASY SAND) Joint Compound only. (2) Use 12" o.c. for seismic conditions.

Notice

The typical limiting height tables on pages 5, 6 and 13 are based primarily on the suggested minimum physical and structural properties (I_x and S_x) shown below in Tables 1–5. The physical and structural properties may vary by region and by manufacturer. Request actual physical and structural property data from your local United States Gypsum Company representative or from your local steel framing manufacturer.

Typical physical properties—Interior stud framing table 1

Stud designation	Stud width —in.	(mm)	Net area —in. ² ⁽¹⁾	Approx. wt. ⁽²⁾	
				lb./ft.	(kg/m)
158ST25	1 1/2"	41.3	0.085	0.33	0.49
212ST25	2 1/2"	63.5	0.102	0.38	0.57
358ST25	3 1/2"	92.1	0.123	0.45	0.67
400ST25	4"	101.6	0.130	0.48	0.71
600ST25	6"	152.4	0.167	0.61	0.91
158ST22	1 1/2"	41.3	0.100	0.45	0.67
212ST22	2 1/2"	63.5	0.103	0.53	0.79
358ST22	3 1/2"	92.1	0.135	0.64	0.95
400ST22	4"	101.6	0.146	0.68	1.01
600ST22	6"	152.4	0.203	0.88	1.31
158ST20	1 1/2"	41.3	0.144	0.56	0.83
212ST20	2 1/2"	63.5	0.173	0.73	1.09
358ST20	3 1/2"	92.1	0.210	0.85	1.27
400ST20	4"	101.6	0.223	0.90	1.34
600ST20	6"	152.4	0.288	1.17	1.74

(1) Net area excluding coating, through section at hole. (2) Average shipping weight including coating.

Typical structural properties—Interior stud framing table 2

Stud design ⁽¹⁾	$I_x^{(2)}$ —in ⁴	$S_x^{(2)}$ —in ³	r_x —in	$I_y^{(2)}$ —in ⁴	$S_y^{(2)}$ —in ³	r_y —in	M_a (k-in) ⁽³⁾
158ST25	0.038	0.040	0.678	0.018	0.024	0.484	0.795
212ST25	0.101	0.071	1.012	0.019	0.024	0.480	1.393
358ST25	0.239	0.113	1.415	0.019	0.024	0.464	2.234
400ST25	0.302	0.123	1.545	0.019	0.024	0.459	2.441
600ST25	0.773	0.184	2.209	0.019	0.024	0.427	3.633
212ST22	0.155	0.110	1.008	0.032	0.037	0.475	2.187
358ST22	0.367	0.182	1.410	0.033	0.037	0.460	3.606
400ST22	0.463	0.209	1.539	0.033	0.038	0.454	4.133
600ST22	1.224	0.342	2.202	0.034	0.038	0.422	6.762
212ST20	0.175	0.123	1.006	0.039	0.044	0.473	2.706
358ST20	0.414	0.213	1.407	0.045	0.046	0.458	4.698
400ST20	0.523	0.246	1.536	0.046	0.047	0.452	5.423
600ST20	1.385	0.437	2.199	0.051	0.048	0.420	9.642

(1) Indicates size, style and gauge: 158-1 1/2"; ST-stud; 20-ga. thickness (see table 7). Yield strength: all styles 33 ksi for ST and 40 ksi for SJ. (2) Effective properties based on AISI Specifications, 1986 edition. (3) Assuming full lateral support. For laterally unbraced structural member, see Section C3.1.2, AISI specifications, 1986 edition.

Typical structural properties—Steel runners table 3

Runner ⁽¹⁾ designation	$I_x^{(2)}$ —in ⁴	$S_x^{(2)}$ —in ³	r_x —in	M_a (k-in) ⁽³⁾
158CR25	0.025	0.022	0.663	0.443
212CR25	0.070	0.043	0.992	0.848
358CR25	0.172	0.061	1.366	1.209
400CR25	0.222	0.068	1.488	1.340
600CR25	0.629	0.101	2.115	1.990
212CR22	0.116	0.073	1.035	1.450
358CR22	0.281	0.128	1.417	2.533
400CR22	0.354	0.149	1.541	2.949
600CR22	0.989	0.220	2.185	4.360
212CR20	0.147	0.095	1.007	1.871
358CR20	0.328	0.160	1.416	3.170
400CR20	0.415	0.185	1.541	3.670
600CR20	0.111	0.304	2.183	6.020

(1) Yield strength is 33 ksi. (2) Effective properties based on AISI Specifications, 1986 edition. (3) Assuming full lateral support. For laterally unbraced structural member, see Section C3.1.2, AISI specifications, 1986 edition.

Thickness—Steel studs and runners⁽¹⁾ table 4

Style	Design ⁽²⁾		Minimum		Gauge ⁽³⁾
	in	mm	in	mm	
ST, CR25	0.0188	0.48	0.0179	0.45	25
ST, CR22	0.0284	0.72	0.0270	0.69	22
ST, CR20	0.0329	0.84	0.0312	0.79	20
SJ, JR20	0.0359	0.91	0.0341	0.87	20
SJ, CR18	0.0478	1.21	0.0454	1.15	18
SJ, CS, CR16	0.0598	1.52	0.0568	1.44	16
SJ, CS, CR14	0.0747	1.90	0.0710	1.80	14

(1) Uncoated steel thickness meets ASTM A568. Studs and runners meet ASTM C645. Coatings are galvanized per ASTM A525; aluminum-zinc per ASTM A792; or ASTM A591 (weights equivalent to A525). (2) Conforms to Sec. A3, AISI Specifications for the Design of Cold-Formed Steel Structural Members, 1986 edition. (3) For information only, refer to limiting height and structural properties table for design data.

Typical physical and structural properties⁽¹⁾—SJ style stud framing ($F_y=40$ ksi)




table 5

Size, style & ga. ⁽²⁾	Weight ⁽³⁾		Net area ⁽⁴⁾ (in ²)	AET (net effective area) (in ²)	Design steel thickness ⁽⁴⁾ (in)	Allow. bending moment about x axis (K-in)	Lip width (in)	Major axis			Minor axis			Full unreduced section modulus S_x (in ³)	Effective section modulus (M_c/S_x) S_e (in ³)	Q (column factor)	J (in ⁴)	C_W (in ⁴)	X_0 (in)
	(lb/ft)	(kg/m)						I_x (in ⁴)	S_x (in ³)	r_x (in)	I_y (in ⁴)	S_y (in ³)	r_y (in)						
362SJ20	0.97	1.44	0.216	0.2136	0.0359	6.557	0.500	0.541	0.273	1.429	0.085	0.082c	0.621	0.302	0.236	0.752	0.0001	0.300700	1.357
362SJ18	1.24	1.85	0.285	0.2713	0.0478	9.247	0.500	0.708	0.385	1.423	0.111	0.106c	0.616	0.395	0.309	0.799	0.0003	0.387	1.345
362SJ16	1.59	2.37	0.368	0.3341	0.0598	11.678	0.625	0.893	0.486	1.411	0.147	0.146c	0.629	0.499	0.387	0.804	0.0005	0.5703	1.420
362SJ14	2.00	2.98	0.454	0.3917	0.0747	14.293	0.625	1.093	0.596	1.404	0.178	0.176c	0.622	0.611	0.466	0.802	0.0011	0.6833	1.406
40SJ20	1.02	1.52	0.228	0.1792	0.0359	7.464	0.500	0.673	0.311	1.556	0.091	0.084c	0.617	0.341	0.271	0.721	0.0001	0.3631	1.313
40SJ18	1.30	1.93	0.301	0.2576	0.0478	10.5	0.500	0.882	0.437	1.550	0.117	0.108c	0.611	0.447	0.355	0.803	0.0003	0.4679	1.301
40SJ16	1.67	2.48	0.388	0.3571	0.0598	13.302	0.625	1.115	0.554	1.539	0.157	0.150c	0.626	0.566	0.447	0.812	0.0006	0.6816	1.374
40SJ14	2.09	3.11	0.480	0.4833	0.0747	16.3	0.625	1.366	0.679	1.532	0.189	0.181c	0.619	0.693	0.539	0.811	0.0011	0.8176	1.359
60SJ20	1.27	1.89	0.300	0.2148	0.0359	12.93	0.500	1.787	0.539	2.253	0.112	0.088c	0.587	0.596	0.495	0.582	0.0002	0.8744	1.111
60SJ18	1.63	2.43	0.397	0.3107	0.0478	18.561	0.500	2.35	0.773	2.246	0.145	0.118c	0.581	0.785	0.659	0.653	0.0004	1.1309	1.099
60SJ16	2.08	3.10	0.508	0.4303	0.0598	23.759	0.625	2.99	0.99	2.243	0.195	0.163c	0.598	0.999	0.836	0.710	0.0007	1.5888	1.163
60SJ14	2.62	3.90	0.629	0.5858	0.0747	29.231	0.625	3.679	1.218	2.234	0.236	0.197c	0.591	1.229	1.017	0.767	0.0014	1.9148	1.148
725SJ18	1.84	2.74	0.457	0.2969	0.0478	24.361	0.500	3.732	1.015	2.663	0.157	0.118c	0.562	1.029	0.875	0.583	0.0004	1.7311	1.005
725SJ16	2.34	3.48	0.583	0.4304	0.0598	31.268	0.625	4.753	1.303	2.664	0.211	0.166c	0.579	1.311	1.121	0.637	0.0008	2.4067	1.064
725SJ14	2.95	4.39	0.720	0.6152	0.0747	35.529	0.625	5.857	1.605	2.654	0.256	0.203c	0.572	1.615	1.366	0.690	0.0015	2.9054	1.050
80SJ18	1.97	2.93	0.493	0.2937	0.0478	27.874	0.500	4.756	1.161	2.908	0.159	0.118c	0.550	1.187	1.018	0.547	0.0004	2.1644	0.956
80SJ16	2.50	3.72	0.628	0.456	0.0598	36.132	0.625	6.059	1.505	2.911	0.219	0.166c	0.568	1.513	1.306	0.600	0.0009	2.9966	1.013
80SJ14	3.15	4.69	0.779	0.6936	0.0747	44.557	0.625	7.473	1.856	2.901	0.265	0.205c	0.561	1.866	1.594	0.652	0.0017	3.6201	0.999
925SJ16	2.76	4.11	0.702	0.4146	0.0598	44.838	0.625	8.691	1.868	3.316	0.227	0.166c	0.550	1.875	1.647	0.546	0.0009	4.1512	0.938
925SJ14	3.48	5.18	0.872	0.6028	0.0747	55.351	0.625	10.73	2.306	3.306	0.278	0.206c	0.543	2.314	2.015	0.594	0.0018	5.0199	0.925
115SJ16	3.23	4.81	0.837	0.4355	0.0598	55.03	0.625	15.03	2.293	4.030	0.229	0.166c	0.521	2.606	2.326	0.470	0.0011	6.7915	0.830
115SJ14	4.07	6.06	1.040	0.5366	0.0747	77.138	0.625	18.58	3.214	4.018	0.292	0.207c	0.514	3.221	2.853	0.512	0.0021	8.2221	0.818
135SJ14	4.60	6.84	1.189	0.8562	0.0747	90.046	0.625	27.99	3.752	4.639	0.295	0.207c	0.491	4.134	3.704	0.456	0.0024	11.83235	0.743

Conforms to 1986 AISI Specification for the Design of Cold-Formed Steel Structural Members. (1) Narrower flange is 1.552 in.; wider flange is 1.724 in. outside width for all SJ-style members. See "Notice" on page 4. (2) Indicates size, style and gauge: 362—3% (3.573"), 40—4" (3.921"), 60—6" (5.921"), 725—7% (7.171"), 80—8" (7.921"), 925—9% (9.171"), 115—11% (11.421"), 135—13% (13.421"), SJ—stud/joist, 20—ga. thickness. (3) Steel with corrosion-resistant coating. (4) Steel without coating.

Typical limiting heights—Interior partitions

table 6

Stud design.	Stud width	Stud spacing	Allow. defl.	Partition, one layer	Partition, two layers	Furring, one layer
						
25 gauge (.0179 min.)						
158ST25	1½"	16"	L/120 L/240 L/360	10'9" f 9'6" d 8'3" d	10'9" d 10'6" d 9'0" d	10'3" d 8'3" d 7'3" d
		24"	L/120 L/240 L/360	8'9" f 8'3" d 7'3" d	8'9" f 8'9" f 8'0" d	8'9" f 7'3" d 6'3" d
212ST25	2½"	16"	L/120 L/240 L/360	13'9" f 12'6" d 10'9" d	13'9" f 13'6" d 11'9" d	13'9" d 11'0" d 9'9" d
		24"	L/120 L/240 L/360	11'3" f 10'9" d 9'6" d	11'3" f 11'3" f 10'3" d	11'3" f 9'9" d 8'6" d
358ST25	3½"	16"	L/120 L/240 L/360	16'9" f 16'0" d 14'0" d	16'9" f 16'9" f 14'9" d	16'9" f 14'6" d 12'9" d
		24"	L/120 L/240 L/360	13'6" f 13'6" f 12'3" d	13'6" f 13'6" f 13'0" d	13'6" f 12'9" d 11'0" d
400ST25	4"	16"	L/120 L/240 L/360	17'3" f 17'3" d 15'0" d	17'3" f 17'3" f 15'9" d	17'3" f 15'9" d 13'9" d
		24"	L/120 L/240 L/360	14'3" f 14'3" f 13'0" d	14'3" f 14'3" f 13'9" d	14'3" f 13'9" d 12'0" d
600ST25	6"	16"	L/120 L/240 L/360	20'0" f 20'0" f 20'0" f	20'0" f 20'0" f 20'0" f	20'0" f 20'0" f 18'9" f
		24"	L/120 L/240 L/360	15'0" v 15'0" v 15'0" v	15'0" v 15'0" v 15'0" v	15'0" v 15'0" v 15'0" v
22 gauge (.0270 min.)						
212ST22	2½"	16"	L/120 L/240 L/360	16'6" d 13'0" d 11'6" d	17'0" f 14'0" d 12'3" d	15'3" d 12'0" d 10'6" d
		24"	L/120 L/240 L/360	14'0" f 11'6" d 10'0" d	14'0" f 12'3" d 10'6" d	13'3" d 10'6" d 9'3" d
358ST22	3½"	16"	L/120 L/240 L/360	21'9" d 17'3" d 15'0" d	22'0" f 18'0" d 15'9" d	20'3" d 16'0" d 14'0" d
		24"	L/120 L/240 L/360	18'0" f 15'0" d 13'0" d	18'0" f 15'9" d 13'9" d	17'9" d 14'0" d 12'3" d

22 gauge (.0270 min.)



400ST22	4"	16"	L/120 L/240 L/360	23'3" f 18'6" d 16'3" d	23'3" f 19'3" d 16'9" d	21'9" d 17'3" d 15'0" d
				19'0" f 16'3" d 14'0" d	19'0" f 16'9" d 14'9" d	19'0" f 15'0" d 13'3" d
				29'0" f 25'3" d 22'0" d	29'0" f 26'0" d 22'9" d	29'0" f 23'9" d 20'9" d
				23'6" f 22'0" d 19'3" d	23'6" f 22'9" d 19'9" d	23'6" f 20'9" d 18'3" d

20 gauge (.0312 min.)

212ST20	2 1/2"	16"	L/120 L/240 L/360	17'4" f 13'10" d 12'0" d	17'11" f 16'1" d 14'0" d	16'6" d 13'0" d 11'6" d
				14'7" f 12'0" d 10'6" d	14'7" f 13'5" f 12'4" d	14'6" d 11'6" d 10'0" d
				22'7" d 17'11" d 15'7" d	23'8" f 20'2" d 17'8" d	21'9" d 17'3" d 15'0" d
				19'4" f 15'7" d 13'8" d	19'4" f 17'8" f 15'6" d	19'0" d 15'0" d 13'3" d
358ST20	3 1/2"	16"	L/120 L/240 L/360	22'7" d 17'11" d 15'7" d	23'8" f 20'2" d 17'8" d	21'9" d 17'3" d 15'0" d
				19'4" f 15'7" d 13'8" d	19'4" f 17'8" f 15'6" d	19'0" d 15'0" d 13'3" d
				22'7" d 17'11" d 15'7" d	23'8" f 20'2" d 17'8" d	21'9" d 17'3" d 15'0" d
				19'4" f 15'7" d 13'8" d	19'4" f 17'8" f 15'6" d	19'0" d 15'0" d 13'3" d
400ST20	4"	16"	L/120 L/240 L/360	24'3" d 19'2" d 16'10" d	25'6" d 21'7" d 18'11" d	23'6" d 18'9" d 16'3" d
				20'9" f 16'10" d 14'8" d	20'9" f 18'11" d 16'6" d	20'6" d 16'3" d 14'3" d
				24'3" d 19'2" d 16'10" d	25'6" d 21'7" d 18'11" d	23'6" d 18'9" d 16'3" d
				20'9" f 16'10" d 14'8" d	20'9" f 18'11" d 16'6" d	20'6" d 16'

Typical limiting heights—Chase wall partitions

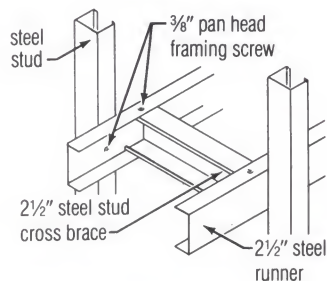
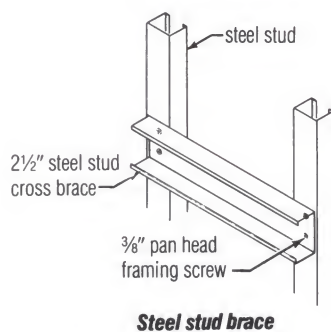
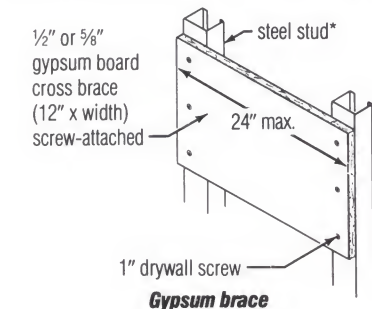
table 7

Stud ga.	Stud width	Stud spacing	Allow. defl.	One layer	Two layers
					
158ST25	1 1/2"	16"	L/120 L/240 L/360	15'3" f 13'3" d 11'6" d	15'3" f 14'6" d 12'9" d
		24"	L/120 L/240 L/360	12'6" f 11'6" d 10'0" d	12'6" f 12'6" d 11'0" d
212ST25	2 1/2"	16"	L/120 L/240 L/360	19'6" f 17'6" d 15'6" d	19'6" f 19'0" d 16'6" d
		24"	L/120 L/240 L/360	16'0" f 15'6" d 13'6" d	16'0" f 16'0" d 14'6" d
358ST25	3 1/2"	16"	L/120 L/240 L/360	23'6" f 22'9" d 19'9" d	23'6" f 23'6" d 21'3" d
		24"	L/120 L/240 L/360	19'3" f 19'3" d 17'3" d	19'3" f 19'3" d 18'6" d

Limiting height for 1/2" or 5/8" thick panels and 5 psf uniform load perpendicular to partition. Assemblies require vertical cross braces 4 ft. o.c. max. Use two-layer heights for multi-layer assemblies. Limiting criteria: d—deflection, f—bending stress. Consult local code authority for limiting criteria.

Chase Wall

Chase walls provide vertical shafts where greater core widths are needed for pipe chase enclosures and other service installations. They consist of a double row of steel studs with gypsum panel cross braces between rows. Double-layer 1/2" SHEETROCK brand Gypsum



Panels are screw-applied on both sides of studs and 1 1/2" THERMAFIBER SAFB are stapled to the back side of one base layer. The assembly offers 55 STC, suitable for party walls, and a 2-hour fire-resistance rating when 1/2" SHEETROCK brand Gypsum Panels, FIRECODE C Core, are used.

As an alternate, 2 1/2" steel stud cross braces screw-attached to chase wall studs may be used. When chase wall studs are not directly opposite, steel stud cross braces 24" o.c. are anchored to horizontal 2 1/2" runners screw-attached to chase wall studs.

Limiting thickness is max. 24" with gypsum board braces; brace spacing 48" o.c. max. vertically; limiting heights are shown above. Other chase walls providing greater height may be constructed with wider or heavier steel studs.

In addition, two layers of 3/4" ULTRACODE Core panels may be substituted for three layers of 1/2" FIRECODE Core panels in UL Design U436 and still achieve the 3-hr. fire-resistance rating.

Resilient Channel Partitions

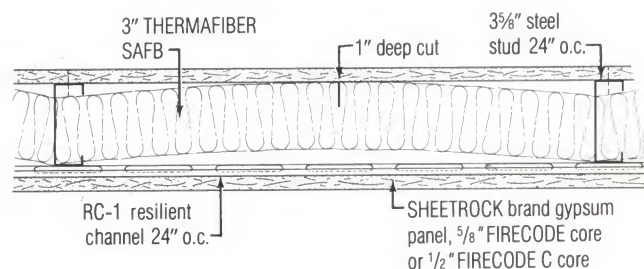
Resilient attachment of gypsum panels with RC-1 Resilient Channels provides low-cost, highly efficient assemblies for increased privacy in corridor and party wall applications. The steel channels float the panels away from the studs and provide a spring action that decouples the board from the framing. When combined with THERMAFIBER SAFB in the framing cavity, highly effective sound attenuation is obtained.

In these thin, lightweight assemblies, horizontal RC-1 Resilient Channels, 24" o.c., are screw-attached one side of 3 1/2" steel studs spaced 24" o.c. and set in runners. Gypsum panels are screw-attached to these channels on one side and directly attached to the steel stud flanges on the opposite partition side. THERMAFIBER SAFB, 3" thick and 25" wide, are inserted and creased in the partition cavity. Because the blanket is wider than the cavity, it presses against the panels, thereby damping sound vibrations more effectively and offering 55 STC sound rating. (Use of a filler strip at the base may reduce STC rating.) Limiting heights for these assemblies are shown in the table below.

Limiting heights—resilient channel assemblies⁽¹⁾

Stud desg.	Stud width	Stud spacing	Allow. defl.	One layer resilient partition
358ST25	3 1/2"	16"	L/120 L/240	16'7" f 13'4" d
		24"	L/120 L/240	13'6" f 11'8" d

(1) Limiting height for 3/4" thick gypsum panels and 5-psf uniform load perpendicular to partition. Studs attached to top and bottom runners on resilient side. Limiting criteria: d—deflection, f—bending stress; consult local code authority for limiting criteria.



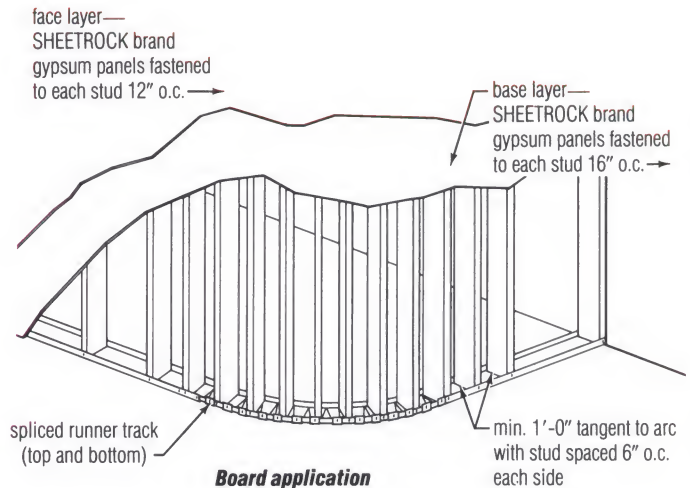
Curved Partitions

Curved partitions are an attractive way to soften the hard lines of flat wall dimensions. They create a flowing dimension that offsets the rigidity of flat wall lines, add appealing depth, and enhance overall decor. Versatile SHEETROCK brand Gypsum Panels can be formed to almost any cylindrically curved surface. In addition, using SHEETROCK brand Gypsum Panels, FIRECODE C Core, will permit 1-hour to 4-hour fire-resistance ratings.

Gypsum panels are applied either dry or wet depending on the radius of curvature desired. To prevent flat areas between framing, shorter bend radii require closer than normal stud spacing.

Panels are horizontally applied, gently bent around framing and securely fastened to achieve the desired radius. When panels are applied dry, the minimum radius of curvature meets many applications (see table for dry gypsum panels). By moistening the face or back paper thoroughly prior to application and replacing the panels in a stack for at least one hour, the panels can be bent to still shorter radii (see table for wetted panels). When panels dry thoroughly, they regain original hardness.

Cutouts for electrical boxes are not recommended in curved surfaces unless they can be made after boards are installed and thoroughly dry.



Minimum bending radii of dry gypsum panel

Panel thickness		Panel applied with long dimension perpendicular to framing		Panel applied with long dimension parallel to framing	
in	mm	ft	m	ft	m
1/4	6.4	5	1.5	15	4.6
3/8	9.5	7 1/2	2.3	25	7.6
1/2	12.7	20 ⁽¹⁾	6.1	—	—

(1) Bending two 1/4" pieces successively permits radii shown for 1/4" gypsum panels.

Minimum bending radii of wetted gypsum panel⁽¹⁾

Panel thickness	Radius	Inside length of arc ⁽²⁾	Outside length of arc ⁽²⁾	No. of studs on arc including those at tangents ⁽³⁾	Approximate stud spacing c. to c. ⁽⁴⁾	Maximum stud spacing ⁽⁴⁾	Ounces of water required per panel side ⁽⁵⁾
1/4"	2' 0"	3.14'	44.0"	9	5.50"	6"	30
1/4"	2' 6"	3.93'	53.4"	10	5.93"	6"	30
3/8"	3' 0"	4.71'	62.8"	9	7.85"	8"	35
3/8"	3' 6"	5.50'	72.2"	11	7.22"	8"	35
1/2"	4' 0"	6.28'	81.6"	8	11.70"	12"	45
1/2"	4' 6"	7.07'	91.1"	9	11.40"	12"	45

(1) For gypsum board applied horizontally to a 4" thick partition.

(2) Arc length = $\frac{3.14 \cdot R}{2}$ (for a 90° arc)

(3) No. studs = outside arc length/maximum spacing + 1 (rounded up to next whole number).

(4) Stud spacing = outside arc length/no. of studs - 1 (measured along outside of runner).

(5) Wet only the side of panel that will be in tension. Water required per panel side is based on a 4'x8' panel.

High Performance Sound Control

Horizontal RC-1 Resilient Channels are screw-attached 24" o.c. to the narrow flange side of SJ steel studs which also are spaced 24" o.c. SHEETROCK brand Gypsum Panels, FIRECODE C Core, are screw-attached directly to the studs on one side and to the resilient channels on the other side. THERMAFIBER SAFB are friction-fitted in the partition cavity. The SAFB are pressed against the direct-applied gypsum panel, leaving a minimum 1/8" space between the resilient channel and the SAFB. All resilient channels are installed with mounting flange down. SHEETROCK Acoustical Sealant is applied between the gypsum panel and the floor. SHEETROCK Acoustical Sealant is also used where a resilient channel mounted gypsum panel intersects a wall plane that is not resilient channel mounted, where a gypsum panel meets a dissimilar material, where outlets and other penetrations need to be sealed, and where expansion or other joints need to be sealed to help prevent cracking.

Versatile—Partition can be designed to meet a specific requirement. Or a single-layer design which meets an acoustic code requirement can be easily and economically upgraded, for example, party walls in apartments or condos.

Fire Resistant—Constructed of noncombustible components, up to 3-hr. fire ratings are available. See page 16.

Sound Isolating—Efficient sound insulation at all frequencies. The multilayer designs provide exceptional isolation at low, mid and high frequencies making them ideal for isolating loud music, mechanical equipment and amplified speech sound sources.

Lightweight, Thin—Allows for the most efficient use of materials and space to meet the needs of a specific project. Structural systems provide means for high acoustic performance, double construction with tall, relatively thin, lightweight partitions.

Economical and Convenient—Low cost, readily available materials install simply and easily; provide highly competitive costs and superior value for the performance offered.

Limitations

- 1 Exposure to excessive or continuous moisture and extreme temperatures should be avoided.
- 2 The fire resistance ratings and exceptionally high sound ratings are predicated upon use of identical components and installation procedures. This includes proper application of SHEETROCK Acoustical Sealant and installation of THERMAFIBER SAFB spaced away from the resilient channels.
- 3 Maximum stud spacing: 24"; maximum resilient channel spacing: 24". Ceramic tile is not recommended for application to single layer panels or on the resilient channel side.
- 4 Variable wind pressure can cause a high-rise building to drift or sway. This can result in movement of the non-load bearing partitions, thus causing noise. United States Gypsum Company assumes no responsibility for the prevention, cause or repair of this job-related noise.

Typical Limiting Heights

Stud designation ⁽¹⁾	Stud width	Stud gauge	Wind load/deflection					
			5 psf		10 psf		15 psf	
			L/240	L/360	L/240	L/360	L/240	L/360
362SJ20	3½"	20	14'9"	13'0"	11'9"	10'3"	10'3"	9'0"
362SJ18		18	16'3"	14'3"	13'0"	11'3"	11'3"	10'0"
362SJ16		16	17'6"	15'3"	14'0"	12'3"	12'3"	10'9"
362SJ14		14	18'9"	16'6"	15'0"	13'3"	13'3"	11'6"
40SJ20	4"	20	15'9"	14'0"	12'9"	11'3"	11'3"	9'9"
40SJ18		18	17'3"	15'3"	14'0"	12'3"	12'3"	10'9"
40SJ16		16	18'9"	16'6"	15'0"	13'3"	13'3"	11'6"
40SJ14		14	20'0"	17'9"	16'3"	14'3"	14'3"	12'6"
60SJ20	6"	20	22'0"	19'3"	17'9"	15'6"	15'6"	13'6"
60SJ18		18	24'0"	21'3"	19'3"	17'0"	17'0"	14'9"
60SJ16		16	26'0"	23'0"	21'0"	18'6"	18'6"	16'0"
60SJ14		14	28'0"	24'9"	22'6"	19'9"	19'9"	17'3"
80SJ18	8"	18	30'6"	26'9"	24'6"	21'6"	21'6"	18'9"
80SJ16		16	33'0"	29'3"	26'6"	23'3"	23'3"	20'6"
80SJ14		14	35'6"	31'3"	28'6"	25'0"	25'0"	22'0"

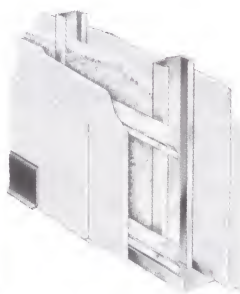
(1) Studs 24" o.c.



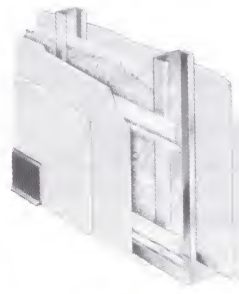
UL Des. U451
56 STC, 48 MTC



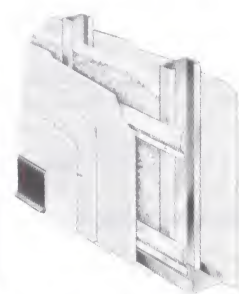
UL Des. U453
58 STC, 52 MTC



UL Des. U454
63 STC, 59 MTC



UL Des. U455
64 STC, 59 MTC



UL Des. U455
63 STC, 58 MTC

Tall Walls

Partitions exceeding 30' in height are considered tall. When these taller than normal partition heights are required, consideration must be given to length restrictions for manufacturing and shipping steel studs, scaffolding, stud placement, etc.

Use double SJ studs back-to-back 24" o.c. The studs should be the maximum practical length so that the splice of one stud in each pair will occur at outer ¼ of the span. The splice of the other stud will occur at the opposite end. Attach studs back to back with screws approximately 4' o.c. Attach each stud flange to top and bottom runner with ½" Type S-12 screws so that each pair of studs will have four screw attachments at each end. Attach 1½" 20 ga. V-bracing to stud flanges on each side approximately 12' o.c. for stud alignment and lateral bracing.

For 5 psf wind load, 20 ga. runner track is recommended. The fasteners should have a capacity of 300-lb. in single shear and bearing. For 10 psf wind load, 18 ga. runner track attached with fasteners with 400-lb. single shear and bearing is recommended.

Runner Attachment Spacing

Maximum wall height	Wind load	
	5 psf	10 psf
40'	24"	24"
48'	24"	20"
55'	24"	16"

Required Double Stud Sizes

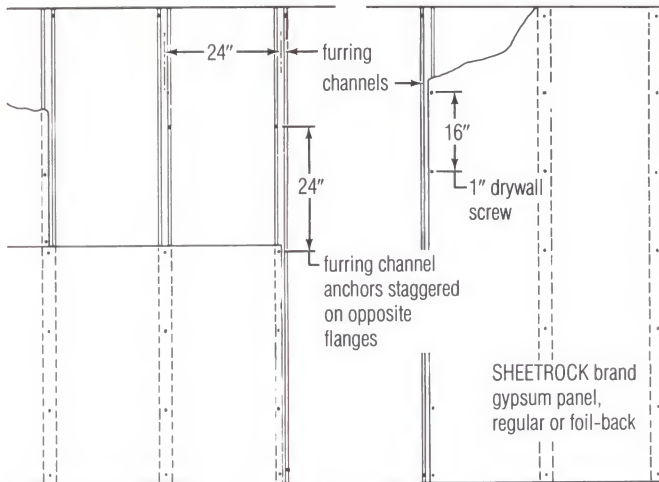
Maximum Wall height	Wind load/deflection			
	5 psf		10 psf	
	L/240	L/360	L/240	L/360
35'	60SJ14 or 725SJ18	725SJ14 or 80SJ16	80SJ14 or 925SJ16	925SJ14 or 115SJ16
40'	725SJ14 or 80SJ16	80SJ14	925SJ14 or 115SJ16	115SJ16
45'	80SJ14	925SJ14	115SJ16	135SJ14
50'	925SJ14	115SJ16	115SJ14	135SJ14
55'	115SJ16	115SJ14	135SJ15	

Wall Furring

Interior and exterior walls are readily furred using ½" SHEETROCK brand Gypsum Panels, Foil-Back, screw-attached to steel framing erected vertically. In these systems, any of three different framing methods may be used to provide a vapor retarder, thermal insulation, and chase space for pipes, conduits and ducts.

With Metal Furring Channels

These furring channels, erected vertically 24" o.c., are fastened directly to interiors of exterior walls of monolithic concrete and virtually any type of masonry—brick, concrete block, tile. Channels may be furred using adjustable wall furring brackets and ¾" cold-rolled channels to provide additional space for pipes, conduits or ducts.



Perpendicular application

Parallel application

With SHEETROCK Z-Furring Channels

In this assembly, SHEETROCK Z-Furring Channels are spaced 24" o.c. THERMAFIBER Fire Safety FS-15 Blanket or rigid foam insulation is friction-fit to interiors of exterior walls. Gypsum panels are screw-attached to channel flanges to provide a drywall surface isolated to a great degree from the masonry wall. In new construction and remodeling, this system provides a highly insulative self-furring solid backup for SHEETROCK brand Gypsum Panels. See construction details on page 26.

Thermal resistance (R) values for various assemblies are shown below.



Installing insulation



Attaching Z-furring channel

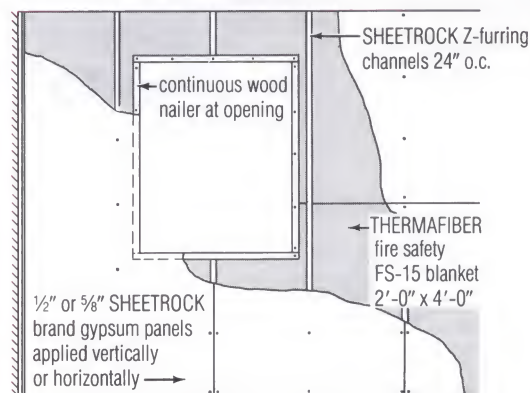


Erecting gypsum panel



Screw-attaching panel

Wall elevation



Design thermal resistance (R) values⁽¹⁾ with SHEETROCK Z-Furring Channel System

Wall construction	Nom. wall thickness	Uninsul. wall	wall ⁽²⁾ (no. insul.)	Wall insulated with— ⁽²⁾											
				THERMAFIBER Fire Safety FS-15 Blankets				Rigid polystyrene				Rigid urethane			
				1" (4.17)	1½" (6.00)	2" (8.00)	3" (12.00)	1" (5.00)	1½" (7.50)	2" (10.00)	3" (15.00)	1" (6.25)	1½" (9.38)	2" (12.50)	3" (18.75)
4" face brick & 8" cinder block	12"	3.01	4.38	7.63	9.46	11.46	15.46	8.46	10.96	13.46	18.46	9.71	12.84	15.96	22.21
4" face brick & 4" com. brick	8"	2.09	3.46	6.71	8.54	10.54	14.54	7.54	10.04	12.54	17.54	8.79	11.92	15.04	21.29
poured conc. (140 lb./cu. ft.)	8"	1.49	2.86	6.11	7.94	9.94	13.94	6.94	9.44	11.94	16.94	8.19	11.32	14.44	20.69
12" conc. block & 4" face brick	16"	2.57	3.94	7.19	9.02	11.02	15.02	8.02	10.52	13.02	18.02	9.27	12.40	15.52	21.77

(1) Resistances based on procedures and design values from 1981 ASHRAE Handbook of Fundamentals, winter conditions (15 mph wind) and neglect the effect of furring channels and fasteners. (2) Interior wall finish: ½" SHEETROCK brand Gypsum Panels, Foil-Back, (R-0.45). R-values for insulation shown in parentheses, based on 75° F. mean temperature for insulation and components.

With Steel Studs

Free-standing furring consists of steel studs erected vertically between floor and ceiling runners. Studs are attached to runner flanges with metal lock fastener tool or screws or lateral bracing on the back-side. SHEETROCK brand Gypsum Panels, Foil-Back, screw-attached to one side of studs, serve as an easily decorated interior surface. This free-standing furring system provides maximum clear chase space and minimizes possibilities for photographing or shadowing to occur over fasteners and furring members.

This assembly consists of stud framing which is secured to the exterior wall with brackets at mid-height when heights greater than 12'0" are required. The adjustable wall furring bracket is anchored to the exterior wall and attached to each stud web with a pan head framing screw. Furring providing greater height may be constructed with wider or heavier steel studs (see tables, page 4).

With USG C-H Stud Framing

An alternate framing system uses USG C-H Studs, J-Runners and SHEETROCK brand Gypsum Liner Panels, quickly erected from one side to provide sturdy fire-rated backup curtain walls. Studs and runners are available in 2½" and 4" widths. SHEETROCK brand Gypsum Liner Panels have a special fire-resistant core encased in water-resistant paper. System provides wall heights to 15'3", wind loads to 40 psf. All components except curtain wall skin may be erected from inside the building.

With USG C-H studs

Limiting heights with interior and exterior facing⁽¹⁾

Design criteria		Stud spacing (in o.c.)	Limiting heights for steel studs by size and gauge		
Wind load	Defl. limit		2½" 212 CH22	2½" 212 CH20	4" 400 CH20
15 psf	L/240	12	11'9"	13'0"	15'3"
		24	10'3"	10'9"	12'6"
	L/360	12	10'3"	11'3"	13'6"
		24	9'10"	9'6"	11'0"
20 psf	L/240	12	10'6"	11'9"	14'0"
		24	9'0"	9'9"	11'6"
	L/360	12	9'3"	10'3"	12'3"
		24	8'3"	8'6"	10'0"
25 psf	L/240	12	9'9"	11'0"	13'0"
		24	8'0"	9'0"	10'6"
	L/360	12	8'6"	9'6"	11'3"
		24	—	8'0"	9'3"
30 psf	L/240	12	9'3"	10'3"	12'3"
		24	—	8'3"	9'6"
	L/360	12	8'0"	9'0"	10'6"
		24	—	—	8'9"
35 psf	L/240	12	8'9"	9'9"	11'6"
		24	—	—	8'0"
	L/360	12	—	8'6"	10'0"
		24	—	—	8'0"
40 psf	L/240	12	8'6"	9'3"	11'0"
		24	—	—	—
	L/360	12	—	8'3"	9'9"
		24	—	—	—

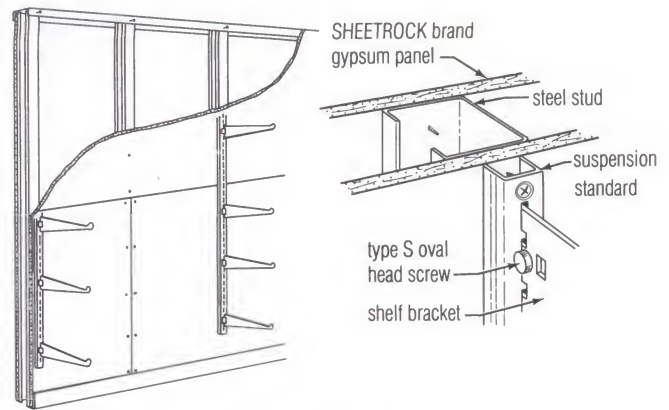
(1) Any independently supported exterior treatment; interior is two layers of ½" SHEETROCK brand Gypsum Panels. Stress based on capacity of studs alone. Deflection based on composite wall assembly without exterior finish.

Shelf-Wall System

This system provides load-carrying walls for shelving in stores, offices, schools and other applications. Incorporating simple, quickly erected, economical steel stud components with Garcy shelf brackets, standards and accessories, the assembly offers advantages of steel stud-drywall construction plus structural strength to support shelving and merchandise.

In this assembly, 3½" steel studs spaced no more than 24" o.c. are securely fastened to floor and ceiling runners and surfaced with either single or double-layer SHEETROCK brand Gypsum Panels. Slotted standards are screw-attached through gypsum board to studs or steel reinforcing inserted between layers.

The system provides a load-carrying partition but is not structurally load-bearing. Limiting height: 16'.



Column and Beam Fireproofing

Drywall systems for column fireproofing consist of SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw-attached to 1½" steel studs at column corners. DUR-A-BEAD or No. 800 Corner Bead concealed with a United States Gypsum Company joint compound resists damage from impact at exterior corners.

These systems are easily and quickly installed without waiting for adhesives to dry. They provide lightweight, thin, compact steel column fire protection of up to four hours depending on the construction. Increased fire protection of primary structural framing members usually permits lower insurance premiums.

In these assemblies, a hard and abrasion-resistant surface may be obtained with a thin veneer (¼" to ⅜" thick) of specially formulated, high-strength veneer finish. IMPERIAL Plaster is applied over IMPERIAL FIRECODE C Gypsum Base in lieu of gypsum panels.

In addition, two layers of ¾" ULTRACODE Core panels achieve a 2-hr. fireproofing rating, and three layers achieve a 3-hr. fireproofing rating, when applied as specified in UL Design X528. UL Design X526 also allows for ULTRACODE Core panels.

Soffits

This assembly consists of galvanized steel channel runners and studs faced with SHEETROCK brand Gypsum Panels, screw attached. It is a lightweight, fast and economical method of filling over cabinets or lockers and of housing overhead ducts, pipes or conduits. The braced system permits constructing soffits with depths of 48" (vertically) and widths to 72" (horizontally). The unbraced system is for soffits up to 24"x24".

Maximum width and depth dimensions⁽¹⁾

Gypsum board thickness ⁽²⁾		steel stud size		Maximum width		Max. depth for max. width shown	
in	mm	in	mm	in	mm	in	mm
½	12.7	1½	41.3	60	1500	48	1200
½	12.7	2½, 3½	63.5, 92.1	72	1800	36	900
¾	15.9	1½	41.3	60	1500	30	800
¾	15.9	2½, 3½	63.5, 92.1	72	1800	18	500

(1) The construction is not designed to support loads other than its own dead weight and should not be used where it may be subjected to excessive abuse.

(2) The double-layer system and ¾" thick gypsum panels are not recommended for this construction.

Floor/Ceilings

These floor/ceilings consist of SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw-attached to metal furring channels clipped or wire-tied to suspended runner channels or wire-tied to supports. Or panels may also be screw-attached below a direct suspension system. And for long spans to accommodate large ducts or pipes in the ceiling space, the steel stud is used as ceiling furring or in a separate system (see page 28.)

The steel stud framing system is ideal for ceilings over office areas in pitched-roof buildings and in modular buildings where ceiling framing is independent of the floor above; accommodates light troffers, ducting and electrical services.

Gypsum panels for these assemblies are available in 1/2" and 5/8" thicknesses and in five types. SHEETROCK brand Gypsum Panels, Foil-Back, offer an effective vapor retarder, when appropriately sealed as determined by the architect and when installed in a workmanlike manner. Regular gypsum panels provide a firm base for acoustical tile adhesively applied. SHEETROCK brand Exterior Gypsum Ceiling Board is suitable for exterior ceilings and soffits with indirect weather exposure.

When water-based spray texture paint will be applied, 1/2" SHEETROCK brand Interior Gypsum Ceiling Board is ideal because it supports both the sprayed texture and insulation like 5/8" thick panels but at less cost.

Limitations

- 1 Steel studs are not designed to carry live loads, mechanical equipment or material storage.
- 2 Maximum spacing: 1 1/2" cold-rolled channels and hangers 48" o.c. For single-layer panels, maximum steel stud and furring channel spacing is 24" o.c. for perpendicular application and 16" o.c. for parallel application. For panels used as base for spray-applied ceiling texture finish, maximum frame spacing is 16" o.c. for 1/2" thick panels perpendicularly applied (parallel panel application not recommended); 24" o.c. for 5/8" thick panels perpendicularly applied, 16" o.c. for parallel application.

Limiting Spans of Metal Furring Channels Between Structural Supports⁽¹⁾

(Limiting Span Between 1 1/2" Channel Is 4'0" o.c. max.)

Type furring member	Member spacing (in. o.c.)	Single layer panels (2.5 psf max.)		Double layer panels (5.0 psf max.)	
		1-span	3-span	1-span	3-span
DWC-25 (hemmed)	16 24	5'9" 5'0"	7'1" 6'2"	4'7" 4'0"	5'8" 4'11"
DWC-20 (unhemmed)	16 24	6'11" 6'0"	8'6" 7'5"	5'5" 4'9"	6'9" 5'11"

(1) Limiting spans for 1/2" and 5/8" thick panels, max. L/240 deflection and uniform load shown. Investigate concentrated loads such as light fixtures and exhaust fans separately.



Limiting spans (')—Steel stud ceiling system⁽¹⁾

Stud style	212ST25			358ST25 ⁽²⁾			400ST25 ⁽²⁾			212ST20			358ST20			400ST20			600ST20			
Stud spacing-in.	12	16	24	12	16	24	12	16	24	12	16	24	12	16	24	12	16	24	12	16	24	
Single span																						
Uniform load —psf	5	10'11"	9'11"	8'8"	14'7"	13'3"	11'7"	15'9"	14'4"	12'6"	13'2"	11'11"	10'5"	17'6"	15'11"	13'11"	19'0"	17'3"	15'0"	26'3"	23'10"	20'10"
	10	8'8"	7'11"	6'9"	11'7"	10'6"	7'3"	12'6"	11'0"	9'0"	10'5"	9'6"	8'3"	13'11"	12'8"	11'0"	15'0"	13'8"	11'11"	20'10"	18'11"	16'6"
	15	7'7"	6'10"	4'9"	9'8"	7'3"	4'9"	10'4"	9'0"	6'8"	9'1"	8'3"	7'3"	12'2"	11'0"	9'8"	13'2"	11'11"	10'4"	18'2"	16'6"	13'11"
	20	6'9"	5'4"	—	7'3"	5'5"	—	9'0"	7'6"	5'0"	8'3"	7'6"	6'4"	11'0"	10'0"	8'4"	11'11"	10'10"	9'0"	16'6"	14'9"	12'0"
Double and triple span																						
Uniform load —psf	5	13'6"	12'4"	10'2"	17'5"	14'8"	11'2"	17'6"	14'7"	11'0"	16'4"	14'10"	12'11"	21'9"	19'9"	17'8"	23'6"	21'4"	18'8"	32'6"	29'6"	25'9"
	10	10'2"	8'8"	6'11"	11'2"	9'2"	6'8"	11'0"	8'9"	6'3"	12'11"	11'9"	10'1"	17'3"	15'8"	13'3"	18'8"	16'11"	14'3"	25'9"	21'10"	16'10"
	15	8'2"	6'11"	5'9"	8'4"	6'8"	4'9"	8'0"	6'3"	4'4"	11'4"	10'0"	8'2"	15'0"	13'3"	10'10"	16'3"	14'3"	11'7"	20'3"	16'10"	13'10"
	20	6'11"	5'9"	4'4"	6'8"	5'3"	—	6'3"	4'10"	—	10'0"	8'9"	7'1"	13'3"	11'6"	9'4"	14'3"	12'4"	9'9"	16'10"	13'10"	10'2"

(1) Based on L/240 allowable deflection. Bracing of top flanges is required and must not exceed 48" o.c. (2) Stud end stiffening required. Additional hangers are necessary when span area exceeds 16 ft².

Curtain Walls

Description

Non-load bearing exterior curtain wall systems with steel framing have been in use for over 20 years and adapt easily to basic design concepts using conventional materials, methods and equipment. These systems have been specified in all parts of the world for office buildings, schools, shopping centers, motels, hotels and apartments.

Versatile Designs—Exterior stucco surfaces offer textural expression of smooth monolithic surfaces or random sculptural relief. Color and texture can be varied by addition of coarse colored aggregates which contrast boldly with brick, glass and concrete.

Surface Finishes—Interior and exterior facings in various combinations meet specific functional and esthetic needs.

Fire Resistant—2-hour rating, other ratings available. See page 19.

Sound Isolation—The attenuating effect of air space and insulation within the framing cuts noise transmitted to the interior.

Thermal Performance—Systems will accommodate energy design requirements for heated and air-conditioned buildings. Greater insulation values are attainable in less wall thickness with steel framing than can be attained with block or concrete.

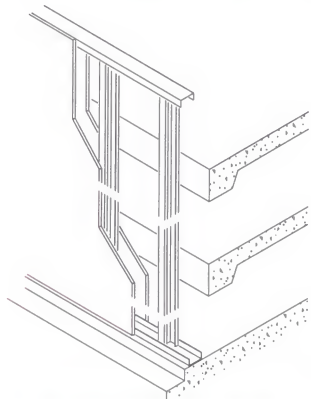
Lightweight—Systems cut weight of brick masonry walls by 25%, of textured panel assemblies up to 66%, to reduce structural foundation requirements.

Air and Water Infiltration—Watertight construction is assured when gypsum sheathing is covered with No. 15 asphalt felt or TYVEK Housewrap sheets; airtight construction when sealants are used in appropriate locations (see Good Design Practices, page 33).

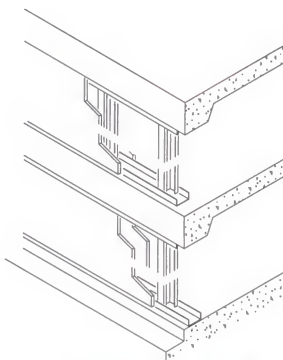
Framing Systems

Steel studs are roll-formed from steel with corrosion-resistant coating and provide wall framing members suitable for attachment of interior drywall, veneer plaster bases and conventional plaster systems. They are an ideal back-up for stucco and synthetic stucco assemblies, reducing dead load 25% in comparison to concrete block backings. The wide choice of stud sizes and spacings accommodates insulation requirements, allows wall heights to 30', wind loads to 40 psf, and a variety of building modules. Requirements for greater wall heights and wind loads can usually be met. Consult architect and/or structural engineer for details.

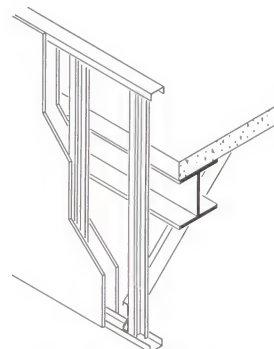
Studs are anchored by screws or welds at top and bottom to specially designed runners, and THERMAFIBER Insulation is inserted in the cavity. Special CR deep leg runner, when left unattached to studs, accommodates floor slab deflection without imposing an axial load on the studs. Studs are braced laterally by screw-attached gypsum sheathing on the exterior and gypsum panels or base on the interior side. Alternately, studs may be braced with straps or cold-rolled channels designed according to AISI Specifications.



Continuous stud wall system



Spandrel wall system



Infill panel system

Interior Surfaces

Interior surfaces may be gypsum drywall or high-strength veneer finish. Hundreds of variations in finishes ranging from smooth trowel to oriental-style textures, painted or fabric covered, are available for interior design.

With *gypsum drywall*, where a vapor retarder is required on the interior side, SHEETROCK brand Gypsum Panels, Foil-Back, 1/2" or 5/8" thick, are screw-attached to the steel studs. SHEETROCK brand Gypsum Panels, FIRECODE Core, provide additional resistance to fire exposure, and are used in assemblies where a fire rating is required.

Veneer plaster finish interiors that require a vapor retarder on the interior side have Foil-Back IMPERIAL Gypsum Base screw-attached to steel studs. IMPERIAL Finish or DIAMOND Interior Finish is applied 1/8" to 3/32" thick over this 4' wide base.

Exterior Surfaces

Exterior surfaces may be unit masonry, portland cement-lime stucco or various decorative panels or siding materials. Brick or other masonry units are laid with a portland cement mortar and BONDCRETE Mason's Lime and secured every 2 sq. ft. with brick anchors screw-attached through the sheathing to steel studs. This system offers speedier building enclosure with the protection of a double-cavity wall and greater variety of insulation options.

Portland cement-BONDCRETE Lime stucco is applied in three coats to a nominal 1" thickness over 3.4-lb. galvanized metal lath. Self-furring metal lath is screw-attached to steel studs through SHEETROCK brand Gypsum Sheathing.

Lightweight, prefabricated glass-fiber reinforced concrete panels with 5" thick THERMAFIBER CW-40 Insulation in the stud cavity offer 2-hr. fire resistance in addition to high thermal performance.

Ceramic tile, thin brick, aggregated or porcelain-enameled panels, prefinished siding and metal panels, aluminum-framed glass and exterior insulation systems may be used over this framing. These surfaces and other dry exterior facings weighing up to 8 psf are applied over sheathing and screw-attached to studs.

Limitations

- 1 Non-load bearing constructions.
- 2 All details, specifications, and data computations contained in this publication concerning Exterior Framing Systems are intended as a general guide for use in wall construction. NO PRODUCT SHOULD BE SPECIFIED OR USED IN ANY DESIGN OR CONSTRUCTION OF ANY STRUCTURE WITHOUT COMPLETE AND DETAILED EVALUATION BY A QUALIFIED STRUCTURAL ENGINEER AND/OR ARCHITECT TO VERIFY THE SUITABILITY OF THE PRODUCT DESCRIBED HEREIN FOR USE IN A GIVEN STRUCTURE.
- 3 United States Gypsum Company assumes no liability for failure resulting from use of alternative materials or improper application or installation of any exterior framing system as selected by the design professional

Typical Curtain Wall Limiting Heights—ST20 style (20-ga.) ($F_y = 33$ ksi)

Maximum allowable simple span limiting heights calculated using stud properties⁽¹⁾

stud properties only

Design criteria		Deflection limitation (L/240)				Deflection limitation (L/360)				Deflection limitation (L/600)			
Wind load (psf)	Stud spacing (in o.c.)	2½"	3½"	4"	6"	2½"	3½"	4"	6"	2½"	3½"	4"	6"
		212ST20	358ST20	400ST20	600ST20	212ST20	358ST20	400ST20	600ST20	212ST20	358ST20	400ST20	600ST20
15 (80 mph)	12	9'1"	12'2"	13'2"	18'2"	8'0"	10'7"	11'6"	15'10"	6'8"	9'0"	9'8"	13'4"
	16	8'3"	11'1"	12'0"	16'7"	7'3"	9'8"	10'6"	14'6"	6'1"	8'2"	8'9"	12'2"
	24	7'3"	9'8"	10'6"	14'6"	6'3"	8'6"	9'1"	12'7"	5'3"	7'1"	7'8"	10'8"
20 (90 mph)	12	8'3"	11'1"	12'0"	16'7"	7'3"	9'8"	10'6"	14'6"	6'1"	8'2"	8'9"	12'2"
	16	7'6"	10'1"	10'10"	15'0"	6'7"	8'9"	9'6"	13'1"	5'7"	7'4"	8'0"	11'1"
	24	6'7"	8'9"	9'6"	13'1"	5'9"	7'8"	8'3"	11'6"	4'10"	6'6"	7'0"	9'8"
25 (100 mph)	12	7'8"	10'3"	11'1"	15'4"	6'8"	9'0"	9'8"	13'4"	5'8"	7'7"	8'2"	11'3"
	16	7'0"	9'3"	10'1"	14'0"	6'1"	8'2"	8'9"	12'2"	5'2"	6'10"	7'4"	10'3"
	24	6'1"	8'2"	8'9"	12'2"	5'3"	7'1"	7'8"	10'8"	4'6"	6'0"	6'6"	9'0"
30 (110 mph)	12	7'3"	9'8"	10'6"	14'6"	6'3"	8'6"	9'1"	12'7"	5'3"	7'2"	7'8"	10'8"
	16	6'7"	8'9"	9'6"	13'1"	5'9"	7'8"	8'3"	11'6"	4'10"	6'6"	7'0"	9'8"
	24	5'9"	7'8"	8'3"	11'6"	5'0"	6'8"	7'2"	10'0"	4'2"	5'8"	6'1"	8'6"
35 (120 mph)	12	6'10"	9'2"	9'10"	13'8"	6'0"	8'0"	8'8"	12'0"	5'1"	6'9"	7'3"	10'1"
	16	6'3"	8'3"	9'0"	12'6"	5'6"	7'3"	7'10"	10'10"	4'7"	6'2"	6'7"	9'2"
	24	5'6"	7'3"	7'10"	10'10"	4'9"	6'4"	6'10"	9'6"	4'0"	5'4"	5'9"	8'0"
40 (125 mph)	12	6'7"	8'9"	9'6"	13'1"	5'9"	7'8"	8'3"	11'6"	4'10"	6'6"	7'0"	9'8"
	16	6'0"	8'0"	8'7"	11'10"	5'2"	7'0"	7'6"	10'4"	4'4"	5'10"	6'4"	8'9"
	24	5'2"	7'0"	7'6"	10'4"	4'7"	6'1"	6'7"	9'1"	3'10"	5'1"	5'7"	7'8"

(1) Any independently supported exterior treatment over gypsum sheathing. Based on properties of studs alone with stress increased 33% for intermittent wind loading. Yield strength for studs and runners is 33 ksi.

Typical Curtain Wall Limiting Heights—SJ style ($F_y = 40$ ksi)

Limiting heights calculated using stud properties⁽¹⁾

stud properties only

Design criteria		Stud spacing (in o.c.)	Simple span limiting heights ⁽¹⁾ for steel studs by size and gauge															
Wind load	Deflection limitation		3½" stud-362SJ				4" stud-40SJ				6" stud-60SJ				8" stud-80SJ			
			20	18	16	14	20	18	16	14	20	18	16	14	18	16	14	
15 psf	L/240	12	13'4"	14'7"	15'9"	16'10"	14'4"	15'8"	16'11"	18'2"	19'10"	21'9"	23'7"	25'3"	27'6"	29'10"	32'0"	
		16	12'1"	13'3"	14'4"	15'4"	13'0"	14'3"	15'5"	16'6"	18'0"	19'9"	21'5"	22'11"	25'0"	27'1"	29'1"	
		24	10'7"	11'7"	12'6"	13'4"	11'4"	12'5"	13'5"	14'5"	15'9"	17'3"	18'8"	20'0"	21'10"	23'8"	25'4"	
	L/360	12	11'8"	12'9"	13'9"	14'9"	12'6"	13'8"	14'10"	15'10"	17'4"	19'0"	20'7"	22'1"	24'0"	26'0"	27'11"	
		16	10'7"	11'7"	12'6"	13'4"	11'4"	12'5"	13'5"	14'5"	15'9"	17'3"	18'8"	20'0"	21'10"	23'8"	25'4"	
		24	9'3"	10'1"	10'11"	11'8"	9'11"	10'10"	11'9"	12'7"	13'9"	15'1"	16'4"	17'6"	19'1"	20'8"	22'2"	
	L/600	12	9'1"	10'9"	11'7"	12'5"	10'7"	11'7"	12'6"	13'4"	14'7"	16'0"	17'4"	18'7"	20'3"	22'0"	23'7"	
		16	8'11"	9'9"	10'6"	11'3"	9'7"	10'6"	11'4"	12'2"	13'3"	14'7"	15'9"	16'11"	18'5"	19'11"	21'5"	
		24	7'9"	8'6"	9'2"	9'10"	8'5"	9'2"	9'11"	10'7"	11'7"	12'9"	13'9"	14'9"	16'1"	17'5"	18'8"	
	20 psf	L/240	12	12'1"	13'3"	14'4"	15'4"	13'0"	14'3"	15'5"	16'6"	18'0"	19'9"	21'5"	22'11"	25'0"	27'1"	29'0"
			16	11'0"	12'0"	13'0"	13'11"	11'10"	12'11"	14'0"	15'0"	16'5"	17'11"	19'5"	20'10"	22'8"	24'7"	26'5"
			24	9'7"	10'6"	11'4"	12'2"	10'4"	11'4"	12'3"	13'1"	14'4"	15'8"	17'0"	18'2"	19'10"	21'6"	23'1"
L/360		12	10'7"	11'7"	12'7"	13'4"	11'4"	12'5"	13'5"	14'5"	15'9"	17'3"	18'8"	20'0"	21'10"	23'8"	25'4"	
		16	9'7"	10'6"	11'4"	12'2"	10'4"	11'4"	12'3"	13'1"	14'4"	15'8"	17'0"	18'2"	19'10"	21'6"	23'1"	
		24	8'5"	9'2"	9'11"	10'7"	9'0"	9'11"	10'8"	11'5"	12'6"	13'8"	14'10"	15'11"	17'4"	18'9"	20'2"	
L/600		12	8'11"	9'9"	10'6"	11'3"	9'7"	10'6"	11'4"	12'2"	13'3"	14'7"	15'9"	16'11"	18'5"	19'11"	21'5"	
		16	8'1"	8'10"	9'7"	10'3"	8'9"	9'6"	10'4"	11'0"	12'1"	13'3"	14'4"	15'4"	16'9"	18'2"	19'5"	
		24	7'1"	7'9"	8'4"	8'11"	7'7"	8'4"	9'0"	9'8"	10'7"	11'7"	12'6"	13'5"	14'7"	15'10"	17'0"	
25 psf		L/240	12	11'3"	12'3"	13'3"	14'2"	12'1"	13'3"	14'4"	15'4"	16'9"	18'4"	19'10"	21'3"	23'2"	25'2"	26'11"
			16	10'2"	11'2"	12'1"	12'11"	11'0"	12'0"	13'0"	13'11"	15'2"	16'8"	18'0"	19'4"	21'1"	22'10"	24'6"
			24	8'11"	9'9"	10'6"	11'3"	9'7"	10'6"	11'4"	12'2"	13'3"	14'7"	15'9"	16'11"	18'5"	19'11"	21'5"
	L/360	12	9'10"	10'9"	11'7"	12'5"	10'7"	11'7"	12'6"	13'4"	14'7"	16'0"	17'4"	18'7"	20'3"	22'0"	23'7"	
		16	8'11"	9'9"	10'6"	11'3"	9'7"	10'6"	11'4"	12'2"	13'3"	14'7"	15'9"	16'11"	18'5"	19'11"	21'5"	
		24	7'9"	8'6"	9'2"	9'10"	8'5"	9'2"	9'11"	10'7"	11'7"	12'9"	13'9"	14'9"	16'1"	17'5"	18'8"	
	L/600	12	8'3"	9'1"	9'9"	10'6"	8'11"	9'9"	10'6"	11'3"	12'4"	13'6"	14'8"	15'8"	17'1"	18'6"	19'10"	
		16	7'6"	8'3"	8'11"	9'6"	8'1"	8'10"	9'7"	10'3"	11'2"	12'3"	13'4"	14'3"	15'6"	16'10"	18'1"	
		24	6'7"	7'2"	7'9"	8'4"	7'1"	7'9"	8'4"	8'11"	9'9"	10'9"	11'7"	12'5"	13'7"	14'8"	15'9"	
	30 psf	L/240	12	10'7"	11'7"	12'8"	13'4"	11'4"	12'5"	13'5"	14'5"	15'9"	17'4"	18'8"	20'0"	21'10"	23'8"	25'4"
			16	9'7"	10'6"	11'4"	12'2"	10'4"	11'4"	12'3"	13'1"	14'5"	15'8"	17'0"	18'2"	19'10"	21'6"	23'1"
			24	8'5"	9'2"	9'11"	10'7"	9'0"	9'11"	10'8"	11'5"	12'6"	13'8"	14'10"	15'11"	17'4"	18'9"	20'2"
L/360		12	9'3"	10'1"	10'11"	11'8"	9'11"	10'10"	11'9"	12'7"	13'9"	15'1"	16'4"	17'6"	19'1"	20'8"	22'2"	
		16	8'5"	9'2"	9'11"	10'7"	9'0"	9'11"	10'8"	11'5"	12'6"	13'8"	14'10"	15'11"	17'4"	18'9"	20'2"	
		24	7'4"	8'0"	8'8"	9'3"	7'11"	8'8"	9'4"	10'0"	10'11"	12'0"	13'0"	13'11"	15'2"	16'5"	17'7"	
L/600		12	7'9"	8'6"	9'2"	9'10"	8'5"	9'2"	9'11"	10'7"	11'7"	12'9"	13'9"	14'9"	16'1"	17'5"	18'8"	
		16	7'1"	7'9"	8'4"	8'11"	7'7"	8'4"	9'0"	9'8"	10'7"	11'7"	12'6"	13'5"	14'7"	15'10"	17'0"	
		24	6'2"	6'9"	7'4"	7'10"	6'9"	7'3"	7'10"	8'5"	9'3"	10'1"	10'11"	11'9"	12'9"	13'10"	14'10"	
35 psf		L/240	12	10'1"	11'0"	11'10"	12'8"	10'10"	11'10"	12'9"	13'8"	15'0"	16'5"	17'9"	19'0"	20'9"	22'6"	24'1"
			16	9'1"	10'0"	10'9"	11'6"	9'10"	10'9"	11'7"	12'5"	13'7"	14'11"	16'2"	17'3"	18'10"	20'5"	21'11"
			24	8'0"	8'9"	9'5"	10'1"	8'7"	9'5"	10'2"	10'10"	11'10"	13'0"	14'1"	15'1"	16'5"	17'10"	19'2"
	L/360	12	8'9"	9'7"	10'4"	11'1"	9'5"	10'4"	11'2"	11'11"	13'1"	14'4"	15'6"	16'7"	18'1"	19'8"	21'1"	
		16	8'0"	8'9"	9'5"	10'1"	8'7"	9'5"	10'2"	10'10"	11'10"	13'0"	14'1"	15'1"	16'5"	17'10"	19'2"	
		24	7'0"	7'7"	8'3"	8'10"	7'6"	8'2"	8'10"	9'6"	10'4"	11'4"	12'4"	13'2"	14'4"	15'7"	16'9"	
	L/600	12	7'5"	8'1"	8'9"	9'4"	8'0"	8'9"	9'5"	10'1"	11'0"	12'1"	13'1"	14'0"	15'3"	16'7"	17'9"	
		16	6'9"	7'4"	7'11"	8'6"	7'3"	7'11"	8'7"	9'2"	10'0"	11'0"	11'11"	12'9"	13'11"	15'1"	16'2"	
		24	5'10"	6'5"	6'11"	7'5"	6'4"	6'11"	7'6"	8'0"	8'9"	9'7"	10'5"	11'2"	12'1"	13'2"	14'1"	
	40 psf	L/240	12	9'7"	10'6"	11'4"	12'2"	10'4"	11'4"	12'3"	13'1"	14'4"	15'8"	17'0"	18'2"	19'10"	21'6"	23'1"
			16	8'9"	9'7"	10'4"	11'0"	9'5"	10'3"	11'1"	11'11"	13'0"	14'3"	15'5"	16'6"	18'0"	19'6"	20'11"
			24	7'7"	8'4"	9'0"	9'8"	8'2"	9'0"	9'8"	10'5"	11'4"	12'5"	13'6"	14'5"	15'9"	17'1"	18'4"
L/360		12	8'5"	9'2"	9'11"	10'7"	9'0"	9'11"	10'8"	11'5"	12'6"	13'8"	14'10"	15'11"	17'4"	18'9"	20'2"	
		16	7'7"	8'4"	9'0"	9'8"	8'2"	9'0"	9'8"	10'5"	11'4"	12'5"	13'6"	14'5"	15'9"	17'1"	18'4"	
		24	6'8"	7'3"	7'10"	8'5"	7'2"	7'10"	8'6"	9'1"	9'11"	10'10"	11'9"	12'7"	13'9"	14'11"	16'0"	
L/600		12	7'1"	7'9"	8'4"	8'11"	7'7"	8'4"	9'0"	9'8"	10'7"	11'7"	12'6"	13'5"	14'7"	15'10"	17'0"	
		16	6'5"	7'0"	7'7"	8'2"	6'11"	7'7"	8'2"	8'9"	9'7"	10'6"	11'4"	12'2"	13'3"	14'5"	15'5"	
		24	5'7"	6'2"	6'8"	7'1"	6'1"	6'7"	7'2"	7'8"	8'4"	9'2"	9'11"	10'8"	11'7"	12'7"	13'6"	

Conforms to 1986 AISI Specification for the Design of Cold-Formed Steel Structural Members.



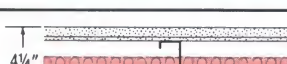







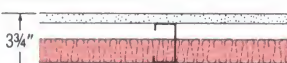



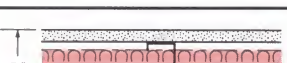

(1) Any independently supported exterior treatment over gypsum sheathing. Based on properties of studs alone with stress increased 33% for wind loading. Yield strength for runners is 33 ksi.

IMPORTANT NOTE: U.S. Gypsum Company does not manufacture these steel framing members. The table above shows minimum limiting heights for "typical" curtain wall construction based on the typical physical and structural properties published in Tables 1 through 5 on pages 4 and 5. The physical and structural values that govern this table are suggested minimums and may vary by region and by manufacturer. Table is meant as a general guideline only. Request actual physical and structural property data from our local United States Gypsum Company representative or framing manufacturer.

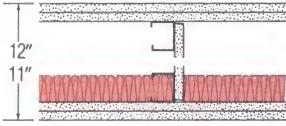

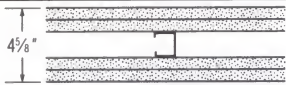
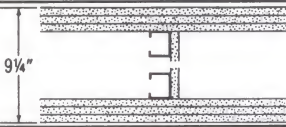
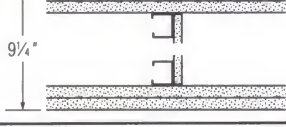


Non-Load Bearing Partitions

Sound-deadening material*

RC-1™ Resilient Channel

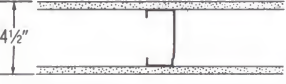
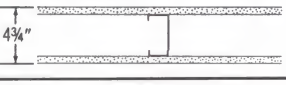
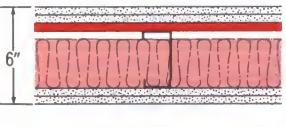
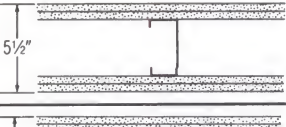
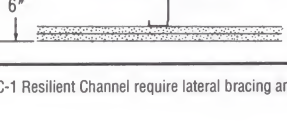
Fire rating	Fire-rated construction Detail & physical data	Description & test no.	Acoustical performance		System reference
			STC	Description & test no.	
1 hr.		Steel Stud— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, ULTRACODE core— $\frac{1}{8}$ " studs 24" o.c.—panels vert appl & screw att with $\frac{1}{4}$ " Type S screws 8" o.c. perim, 12" o.c. field—joints stag & fin— UL Des U496			A
1 hr.		Steel Stud— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core— $\frac{1}{2}$ " studs 24" o.c.—single layer panels ea side appl vert & screw att— $\frac{1}{2}$ " THERMAFIBER SAFB—joints fin—perimeter caulked— UL Des U448 wt 5 width $3\frac{1}{2}$ "	45 48	TL-69-42 Based on $3\frac{1}{2}$ " studs & 2" SAFB— SA-800422	B
1 hr. est		Steel Stud— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE core— $\frac{1}{2}$ " studs 24" o.c.— $\frac{1}{2}$ " THERMAFIBER SAFB—2 layers—base layer $\frac{1}{2}$ " SHEETROCK brand gypsum panels screw att— $\frac{1}{4}$ " facelayer screw att—joints fin—perimeter caulked—est. fire rating based on T-1174-OSU wt 7 width $4\frac{1}{4}$ "	55 53	CK-684-14 Based on $\frac{1}{2}$ " thick panels— CK-684-13	C
1 hr.		Steel Stud—resil partition— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C Core, or $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE core— $\frac{3}{8}$ " studs 24" o.c.— $\frac{3}{8}$ " THERMAFIBER SAFB 25" wide creased to fit cavity—RC-1 chan24" o.c. screw att one side—panels vert appl & screw att—joints stag & fin—perimeter caulked— UL Des U451 wt 6 width $5\frac{1}{8}$ "	55 54	Based on $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE core & 25" wide creased SAFB— SA-850415 Based on $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE core— SA-850415	D
1 hr. est		Steel Stud— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core— $\frac{1}{2}$ " studs 24" o.c.—single layer panels one side appl vert & screw att— $\frac{1}{2}$ " THERMAFIBER SAFB—2 layers opp side—panels appl vert & screw att—joints stag & fin—perimeter caulked—est. fire rating based on T-3362-OSU wt 7 width 4"	50 41	SA-800504 Based on same construction without SAFB— TL-69-148	E
1 hr.		Steel Stud—2 layers $\frac{1}{2}$ " SHEETROCK brand gypsum panels ea side— $\frac{1}{8}$ " studs 24" o.c.—panels appl vert & screw att—joints stag & fin—perimeter caulked— U of C 9-21-64 wt 9 width $3\frac{3}{8}$ "	55	Based on SHEETROCK brand gypsum panels FIRECODE C core, & $\frac{1}{2}$ " SAFB— USG-840824	F
1 hr.		Steel Stud— $\frac{3}{8}$ " SHEETROCK brand gypsum panels, FIRECODE core— $\frac{3}{8}$ " studs 24" o.c.—single layer panels vert or horiz appl & screw att—joints stag & fin—perimeter caulked— UL Des U465 —based on panels horiz appl— GA-WP-1200 wt 6 width $4\frac{7}{8}$ "	40 49 51	USG-860808 Based on 3" SAFB in cavity— SA-870717 Based on FIRECODE C core panels and 3" SAFB 25" wide, creased to fit cavity— TL-90-166	G
1 hr.		Steel Stud— $\frac{3}{8}$ " SHEETROCK brand gypsum panels, FIRECODE core— $\frac{1}{8}$ " studs 24" o.c.—single layer panels vert appl & screw att 12" o.c.—joints fin—perimeter caulked— U of C 7-31-62 wt 5 width $2\frac{7}{8}$ "	38	USG-860809	H
1 hr.		Steel Stud— $\frac{3}{8}$ " SHEETROCK brand gypsum panels, FIRECODE core— $\frac{1}{2}$ " studs 24" o.c.— $\frac{1}{2}$ " THERMAFIBER SAFB—panels apply horiz & screw att—joints opposite—vert joints unfin—horiz joints fin— CEG 8-11-83 —rating also applies to assembly with $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core, joints fin— CEG 5-9-84 wt 6 width $3\frac{3}{4}$ "	47	SA-831001	I
1 hr.		Steel Stud Chase Wall— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE core, ea side— $\frac{1}{8}$ " studs 24" o.c. in 2 rows spaced $6\frac{1}{4}$ " apart— $\frac{1}{2}$ " gypsum panel gussets or steel run braces spanning chase screw att to studs—panels appl vert & screw att—joints stag & fin— UL Des U420 wt 6 width $10\frac{3}{4}$ "	52	Based on $3\frac{3}{4}$ " insulation on one side— TL-76-155	J
1 hr. (truss 3 hr.)		Steel Stud— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core, ea side—fireproofed steel truss— $\frac{1}{2}$ " studs 24" o.c. in 2 rows spaced 8" apart— $\frac{1}{2}$ " gypsum panel gussets spanning chase att to stud at qtr & ctr points—panels appl vert & screw att—joints stag & fin— UL Des U805 wt 6 width $14\frac{1}{4}$ "	N/A		K
2 hr.		Steel Stud— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, ULTRACODE core, ea side— $\frac{3}{4}$ " or $3\frac{1}{2}$ " studs 24" o.c.— $\frac{3}{8}$ " THERMAFIBER SAFB—panels vert appl & screw att 8" o.c. perim, 12" o.c. field—joints stag & fin—perimeter caulked— UL Des U491	50	USG-910617	L
2 hr.		Steel Stud—2 layers $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core, ea side— $\frac{1}{8}$ ", $\frac{1}{2}$ " or $\frac{3}{8}$ " studs 24" o.c.—base layer appl vert, face layer appl vert or horiz, joints stag—base layer screw att—face layer strip lamin or screw att—joints fin—perimeter caulked—with or rating based on assembly without sound atten blankets— UL Des U412 wt 10 width $4\frac{1}{2}$ "	50 55 52	Based on $3\frac{3}{8}$ " stud assembly without SAFB— USG-840817 Based on $3\frac{3}{8}$ " studs and $\frac{1}{2}$ " SAFB— SA-800421 Based on lamin, face layer, $\frac{1}{2}$ " SAFB and $\frac{1}{2}$ " studs— SA-860932	M
2 hr.		Steel Stud— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core, ea side— $\frac{1}{2}$ " studs 24" o.c.—base layer appl vert, face layer appl vert or horiz, joints stag—base layer screw att—face layer strip lamin or screw att—joints fin—perimeter caulked—with or rating based on assembly without sound atten blankets— UL Des U412 wt 10 width $4\frac{1}{2}$ "	50 55 52	Based on $3\frac{3}{8}$ " stud assembly without SAFB— USG-840817 Based on $3\frac{3}{8}$ " studs and $\frac{1}{2}$ " SAFB— SA-800421 Based on lamin, face layer, $\frac{1}{2}$ " SAFB and $\frac{1}{2}$ " studs— SA-860932	M
2 hr.		Steel Stud—2 layers $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE core, plain or vinyl faced vert appl ea side— $\frac{1}{2}$ " studs or 24" o.c.—base layers screw att—face layer lamin or screw att—joints stag & fin or unfin—perimeter caulked— UL Des U411 wt 12 width $6\frac{1}{8}$ "	48 56	Based on $3\frac{3}{8}$ " studs and $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core— BBN-770408 Based on $3\frac{3}{8}$ " studs and 3" SAFB— USG-840818	N
2 hr.		Steel Stud—2 layers $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE core, ea side— $\frac{1}{2}$ " studs 24" o.c.—panels appl horiz & joints stag—base and face layers screw att—joints fin—perimeter caulked— GA-WP-1548 wt 12 width 5"	51 56	Based on $\frac{1}{2}$ " SAFB in cavity— GA-WP-1548 Based on 2" SAFB in cavity— USG-840819	O

*Where thermal insulation is shown in assembly drawings, the specific product is required in the assembly to achieve the stated fire-rating. Fiberglass insulation can not be substituted for THERMAFIBER Insulation.

Fire rating	Fire-rated construction Detail & physical data	Description & test no.	Acoustical performance		System reference
			STC	Description & test no.	
2 hr.		Steel Stud Chase Wall—2 layers 5/8" SHEETROCK brand gypsum panels, FIRECODE C core, ea side—1 1/2" studs 24" o.c. in 2 rows spaced 6 1/2" apart—3/8" gypsum panel gussets or steel run braces spanning chase screw att to studs—panels appl vert & screw att—joints stag & fin— UL Des U420 wt 13 width 12"	52 57	TL-76-162 Based on 3 1/2" insulation one side— TL-76-156	P
2 hr. est		Steel Stud Chase Wall—2 layers 5/8" SHEETROCK brand gypsum panels, FIRECODE C core, ea side—1 1/2" studs 24" o.c. in 2 rows spaced 5 1/2" apart—3/8" gypsum panel gussets spanning chase att to studs at qtr points—panels appl vert & screw att—1 1/2" THERMAFIBER SAFB—joints stag & fin—perimeter caulked—est. fire rating based on UL Des U412 wt 11 width 11"	55	SA-860907	Q
3 hr.		Steel Stud—3 layers 5/8" SHEETROCK brand gypsum panels, FIRECODE C core, ea side—1 1/2" studs 24" o.c.—base layers appl vert—face layer appl horiz—panels screw att with joints stag and fin—perimeter caulked—rating based on assembly with or without SAFB— UL Des U435 wt 13 width 4 3/8"	59	Based on assembly with 1 1/2" SAFB in cavity— SA-830112	R
3 hr.		Steel stud—2 layers 5/8" SHEETROCK brand gypsum panels, ULTRACODE core, ea side—1 1/2" studs 24" o.c.—base layer appl vert and att with 1 1/4" Type S screws 24" o.c., face layer att vert or horiz with 2 1/4" Type S screws 12" o.c.—att horiz joints with Type G screws midway betw framing (24" o.c.)—joints fin—perimeter caulked— UL Des U435			S
3 hr.		Steel Stud—3 layers 5/8" SHEETROCK brand gypsum panels, FIRECODE C core, ea side—1 1/2" studs 24" o.c. in 2 rows spaced 3" apart—steel truss member—gypsum panel gussets or steel run braces spanning chase screw att to studs—panels appl vert & screw att—joints stag & fin—2 hr. rating applies with 2 layers panels ea side—1 hr. rating applies with single layer 5/8" panels ea side— UL Des U436 wt 13 width 9 1/4"	N/A		T
3 hr.		Steel stud chase wall—2 layers 5/8" SHEETROCK brand gypsum panels, ULTRACODE core, ea side—1 1/2" studs 24" o.c. in two rows spaced 2" apart—steel truss member—gypsum panel gussets or stl run braces spanning chase screw-att to studs—base layer appl vert and att with 1 1/4" Type S screws 24" o.c., face layer att vert or horiz with 2 1/4" Type S screws 12" o.c.—att horiz joints with Type G screws betw midway framing (24" o.c.)—joints stag & fin— UL Des U436			U
4 hr.		Steel Stud—2 layers 5/8" SHEETROCK brand gypsum panels, ULTRACODE core, ea side—2 1/2" studs 24" o.c.—2" THERMAFIBER SAFB—base layer appl vert, joints stag & screw att 24" o.c.—face layer appl vert or horiz & screw att 12" o.c.—att along horiz joints with Type G screws midway betw framing (24" o.c.)—joints fin—perimeter caulked— UL Des U490	56	USG-910907	V
4 hr.		Steel Stud—4 layers 5/8" SHEETROCK brand gypsum panels, FIRECODE C core, ea side—1 1/2" studs 24" o.c.—base layers appl vert—face layer appl horiz—panels screw att with joints stag & fin—perimeter caulked—rating based on assembly with or without sound atten fire blankets— UL Des U435 wt 17 width 5 3/8"	62	Based on assembly with 1 1/2" SAFB in cavity— SA-830113	W

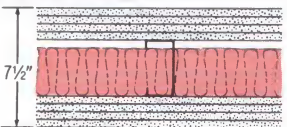
Steel stud ST25 will provide above fire and sound ratings.

Load-Bearing Partitions


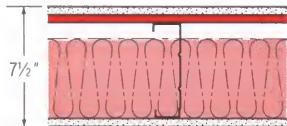
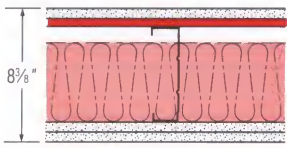
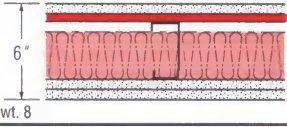
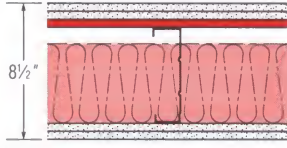
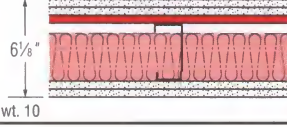
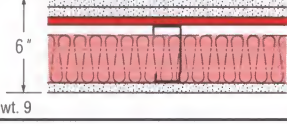
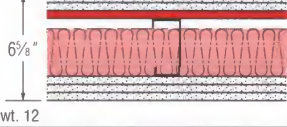
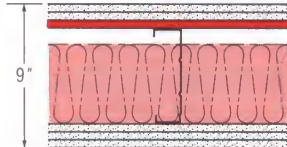
Fire rating	Fire-rated construction Detail & physical data	Description & test no.	Acoustical performance		System reference
			STC	Description & test no.	
45 min.		5/8" SHEETROCK brand gypsum panels, FIRECODE C core—35SJ20 studs 24" o.c.—panels appl vert & att with 1" Type S-12 screws 12" o.c.—joints fin— load bearing up to 100% allowable stud axial — UL Des U425	47	Based on engineering evaluation using 3" SAFB in cavity	A
1 hr.		5/8" SHEETROCK brand gypsum panels, FIRECODE C core—35SJ20 studs 24" o.c.—panels appl vert & att with 1" Type S-12 screws 12" o.c.—joints fin— load bearing up to 100% allowable stud axial — UL Des U425	40 41	USG-810519 Based on 2" SAFB in cavity— USG-810518	B
1 hr.		Dbl layer 5/8" SHEETROCK brand gypsum panels, FIRECODE C core—35SJ20 studs 24" o.c.—1", 1 1/2", 2", 3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—panels appl vert with joints stag—base layer att with 1" Type S-12 screws 12" o.c.—face layer att with 1 1/2" Type S-12 screws 12" o.c.—joints fin—rating also applies with IMPERIAL FIRECODE C base and veneer finish surface— load bearing up to 100% allowable stud axial — UL Des U440	61 51	Based on 35SJ16 studs, 3/8" thick panels, lateral bracing and 3" SAFB cavity— SA-830628* Based on 35SJ 16 studs and lateral bracing— SA-840715	C
1 1/2 hr.		Dbl layer 5/8" SHEETROCK brand gypsum panels, FIRECODE C core—35SJ20 studs 24" o.c.—panels appl vert—base layer att with 1" Type S-12 screws 12" o.c.—face layer att with 1 1/2" Type S-12 screws 12" o.c.—joints fin— load bearing up to 100% allowable stud axial — UL Des U425	49 49	Based on 2" SAFB— USG-811009 Based on 2" SAFB and 60SJ20 studs— USG-810940	D
2 hr.		Dbl layer 5/8" SHEETROCK brand gypsum panels, FIRECODE C core—35SJ20 studs 24" o.c.—panels appl vert—base layer att with 1" Type S-12 screws 12" o.c.—face layer att with 1 1/2" Type S-12 screws 12" o.c.—joints fin— load bearing up to 80% allowable stud axial — UL Des U425	48 49	Based on 2" SAFB in cavity— USG-811006 Based on 2" SAFB and 60SJ20 studs— USG-810937	E

*Assemblies with RC-1 Resilient Channel require lateral bracing and offer estimated fire rating.

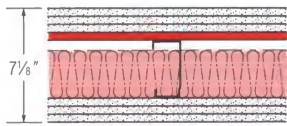
Load-Bearing Partitions (cont.)

Fire rating	Fire-rated construction Detail & physical data	Description & test no.	Acoustical performance		System reference
			STC	Description & test no.	
3 hr.		Four layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, ea side—35SJ20 studs 24" o.c.—1", 1 1/2", 2" or 3" THERMAFIBER SAFB optional—base layers appl vert with joints stag—base panels att with Type S-12 screws 48" o.c.—face layer appl vert or horiz with 2 1/2" Type S-12 screws 12" o.c. and 1 1/2" Type G screws in panels—rating also applies with IMPERIAL FIRECODE C base and veneer finish surface—load bearing up to 100% allowable stud axial load—UL Des U426			F

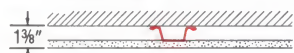
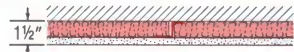
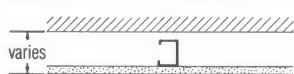
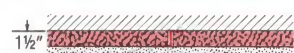
High Performance Sound Control

Fire rating	Fire-Rated construction Detail & physical data	Description & test no.	Acoustical performance		System reference
			STC	Description & test no.	
1 hr.		Resil Stud Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE50 C core—362SJ20 studs 24" o.c.—3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—single-layer gypsum panels screw-att to studs & RC-1 chan—panels appl vert with joints stag—joints fin—perimeter caulked—UL Des U451	50 54	RAL-TL-87-156 (42 MTC) Based on 1/2" thick panels— RAL-TL-83-216 (47 MTC)	A
1 hr.		Resil Stud Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—60SJ20 studs 24" o.c.—5" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—single-layer gypsum panels screw-att to studs & RC-1 chan—panels appl vert with joints stag—joints fin—perimeter caulked—UL Des U451	56 56	RAL-TL-87-139 (48 MTC) Based on 1/2" thick panels— RAL-TL-84-141 (50 MTC)	B
1 1/2 hr.		Resil Stud Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—60SJ20 studs 24" o.c.—5" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—2 layers gypsum panels screw-att to studs, 1 layer screw-att to chan—panels appl vert with joints stag—joints fin—perimeter caulked—UL Des U452	59	RAL-TL-84-140 (54 MTC)	C
1 1/2 hr.		Resil Stud Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—362SJ20 studs 24" o.c.—3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—2 layers gypsum panels screw-att to studs, 1 layer screw-att to chan—panels appl vert with joints stag—joints fin—perimeter caulked—UL Des U452	58	RAL-TL-83-215 (52 MTC)	D
2 hr.		Resil Stud Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—60SJ20 studs 24" o.c.—5" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—double-layer gypsum panels screw-att to studs & RC-1 chan—panels appl vert with joints stag—joints fin—perimeter caulked—UL Des U454	63 62	RAL-TL-87-141 (59 MTC) Based on 1/2" thick panels— RAL-TL-84-139 (58 MTC)	E
2 hr.		Resil Stud Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—362SJ20 studs 24" o.c.—3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—2 layers gypsum panels screw-att to chan, 2 layers screw-att to chan—panels appl vert with joints stag—joints fin—perimeter caulked—UL Des U454	60 61	RAL-TL-87-154 (54 MTC) Based on 1/2" thick panels— RAL-TL-83-214 (57 MTC)	F
2 hr.		Resil Stud Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—362SJ20 studs 24" o.c.—3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—single-layer gypsum panels screw-att to studs, 2-layers screw-att to chan—panels appl vert with joints stag—joints fin—perimeter caulked—UL Des U453	58 60 59	Estimated sound test (52 MTC) Based on 1/2" thick panels, 60SJ20 studs, 5" SAFB— RAL-TL-87-140 (54 MTC) Based on 1/2" thick panels, 60SJ20 studs, 5" SAFB— RAL-TL-84-136 (54 MTC)	G
3 hr.		Resil Stud Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—362SJ20 studs 24" o.c.—3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—3 layers gypsum panels screw-att to studs, 2 layers screw-att to chan—panels appl vert with joints stag—joints fin—perimeter caulked—UL Des U455	61 62	RAL-TL-87-153 (56 MTC) Based on 1/2" thick panels— RAL-TL-83-213 (59 MTC)	H
3 hr.		Resil Stud Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—60SJ20 studs 24" o.c.—5" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—3 layers gypsum panels screw-att to stud, 2 layers screw-att to chan—panels appl vert with joints stag—joints fin—perimeter caulked—UL Des U455	64 63 65	RAL-TL-87-142 (59 MTC) Based on 1/2" thick panels— RAL-TL-84-138 (59 MTC) Based on 1/2" thick panels, acoustical sealant bead between panels and studs, dabs 8" o.c. between panel layers on stud side— RAL-TL-84-150 (60 MTC)	I

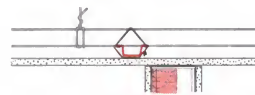
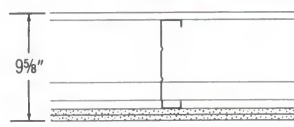
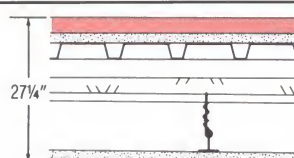
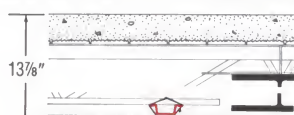
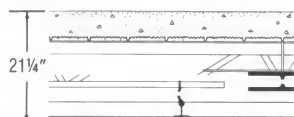

High Performance Sound Control (cont.)

Fire rating	Fire-Rated construction Detail & physical data	Description & test no.	Acoustical performance		System reference
			STC	Description & test no.	
3 hr.	 7 1/2" wt. 14	Resil Stud Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—362SJ20 studs 24" o.c.—3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—3 layers gypsum panels screw-att to studs, 3 layers screw-att to chan—panels appl vert with joints stag—joints fin—perimeter caulked— UL Des U455	63 65	RAL-TL-87-152 (58 MTC) 60SJ20 studs, 5" SAFB RAL-TL-87-143 (61 MTC)	J

Wall Furring

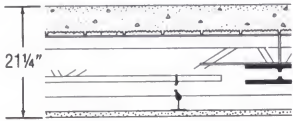
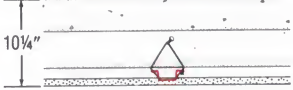
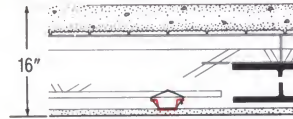
Detail & physical data	Description	Comments	System reference
 1 3/8"	Metal furring channels 24" o.c., 1/2" SHEETROCK brand gypsum panels, foil-back, screw-attached, joints finished	Provides good vapor resistance; no limiting height	A
 1 1/2"	SHEETROCK Z-furring channels applied vertically 24" o.c., THERMAFIBER fire safety FS-15 blankets between channels, 1/2" SHEETROCK brand gypsum panels, foil-back, screw-attached to channels, joints finished	Noncombustible system with mineral fiber insulation; suitable for up to 3" thick insulation; good vapor retarder; no limiting height	B
 varies	Steel studs 24" o.c., set in runners, 1/2" SHEETROCK brand gypsum panels, foil-back, screw-attached to studs, joints finished	Free-standing; allows for pipe chase clearance; good vapor retarder	C
 1 1/2"	SHEETROCK Z-furring channels applied vertically 24" o.c., rigid plastic foam insulation between channels, 1/2" SHEETROCK brand gypsum panels, foil-back, applied vertically and screw-attached to channels, joints finished	Suitable for up to 3" thick insulation; no limiting height.	D

Non-Load Bearing Ceilings

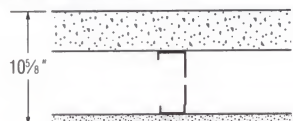
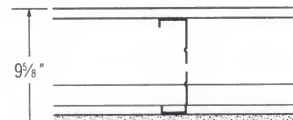
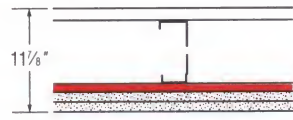
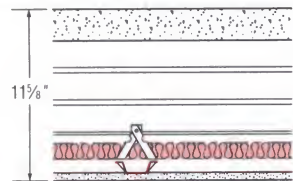

Fire rating	Fire-rated construction Detail & physical data	Description & test no.	Acoustical performance		System reference
			STC	IIC Description & test no.	
N/A		1/2" SHEETROCK brand gypsum panels, FIRECODE core—1 1/2" cr chan 4' o.c.—met fur chan 24" o.c.—panels screw att 12" o.c.—joints fin clg wt 3	N/A		A
1 hr. (beam 1 hr.)	 9 5/8"	1/2" SHEETROCK brand gypsum panels, FIRECODE C core—725SJ18 steel joists 24" o.c.—dbl layer gypsum panel clg and 3/8" T&G plywd flr att to joists with Type S-12 screws—dbl layer gypsum panels around beam—joints exp— UL Des L524 clg wt 4	39 43	Based on 95SJ16 joists— USG-760105 Based on 95SJ16 joists and 3" SAFB*— USG-760310 Based on 95SJ16 joists and carpet & pad— USG-760106 Based on 95SJ16 joists and carpet & pad with 3" SAFB*— USG-760405	B
1 1/2 hr.	 27 1/4"	1/2" SHEETROCK brand gypsum panels, FIRECODE C core—susp grid with main run 4' o.c. and cross tees 2' o.c.—gypsum panels screw-att below grid—joints stag and fin—min 1" roof insul and 1/2" gypsum bd on steel deck over bar joists—1-hr. rating based on assembly with 1/2" thick panels— UL Des P510 clg wt 4	N/A		C
2 hr. (beam 2 hr.)	 13 7/8"	1/2" SHEETROCK brand gypsum panels, FIRECODE C core—furred or susp—met fur chan 24" o.c.—panels att with 1" Type S screws 12" o.c.—joints exp or fin—2 1/2" conc on riblath or corrugated steel deck over bar joist— UL Des G515 clg wt 3	N/A		D
2 hr. (beam 3 hr.)	 21 1/4"	1/2" SHEETROCK brand gypsum panels, FIRECODE C core—susp grid with main run 4' o.c. and cross tees 2' o.c.—gypsum panels screw-att below grid—joints fin—2 1/2" conc on riblath over bar joist— UL Des G529 clg wt 3	N/A		E
2 hr.	 9 1/2"	1/2" SHEETROCK brand gypsum panels, FIRECODE C core—met fur chan 24" o.c.—panels att with 1" Type S screws—joints fin—2" prestressed reg or lightwt conc units with 6" deep stems 48" o.c.— UL Des J502—UL Des J503 clg wt 3	N/A		F

*Insulation may affect fire rating. See SA-905.

Non-Load Bearing Ceilings (cont.)

Fire rating	Fire-rated construction Detail & physical data	Description & test no.	Acoustical performance			System reference
			STC	IIC	Description & test no.	
3 hr. (beam 3 hr.)		1/2" SHEETROCK brand gypsum panels, FIRECODE C core—susp grid with main run 4' o.c. and cross tees 2' o.c.—gypsum panels screw-att below grid—joints fin—3/4" conc on riblath over bar joist—rating also applies with 3/8" panels and 2 3/4" conc slab— UL Des G529 clg wt 3	N/A			G
3 hr.		1/2" SHEETROCK brand gypsum panels, FIRECODE C core—met fur chan 24" o.c.—panels att with 1" Type S screws—joints fin—prestressed 2 1/4" reg or 2 1/2" lightwt conc units with 6" deep stems 48" o.c.— UL Des J502—UL Des J503—UL Des J504 clg wt 3	N/A			H
3 hr. (beam 3 hr.)		1/2" SHEETROCK brand gypsum panels, FIRECODE C core—met fur chan 24" o.c.—panels att with 1" Type S screws 12" o.c.—joints exp or fin—3" conc on corrugated steel deck or on riblath over bar joist— UL Des G512 clg wt 3	N/A			I

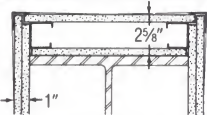
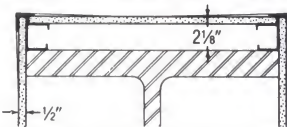
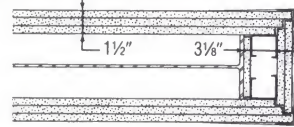
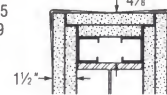
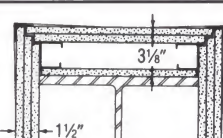
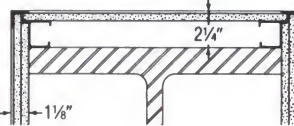
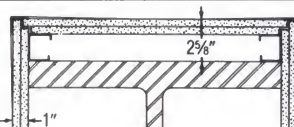
Load Bearing Ceilings

Fire rating	Fire-rated construction Detail & physical data	Description & test no.	Acoustical performance			System reference
			STC	IIC	Description & test no.	
1 hr.		1/2" SHEETROCK brand gypsum panels, FIRECODE C core—75SJ18 steel joists 24" o.c.—2 1/2" conc fir on corrug steel deck—gypsum panel ceiling att to joists with 1" Type S-12 screws 12" o.c.—joints fin—est. fire rating based on witnessed laboratory test	45		Based on RC-1 resil chan 24" o.c.— KAL-443536 Based on carpet & pad— KAL-443535	A
1 hr. (beam 1 hr.)		1/2" SHEETROCK brand gypsum panels, FIRECODE C core—72SJ18 steel joists 24" o.c.—1/2" T&G plywd fir att to joists with Type S-12 screws 6" o.c. around perim., 10" o.c. in field—dbl layer gypsum panel clg and dbl layer gypsum panels around beam—joints exp—includes unrestrained beam— UL Des L524	39 43 56 60		Based on 95SJ16 joists— USG-760105 Based on 95SJ16 joists and 3" S&F— USG-760310 Based on 95SJ16 joists and carpet & pad— USG-760106 Based on 95SJ16 joists and carpet & pad with 3" S&F— USG-760405	B
1 1/2 hr.		Resilient 1/2" SHEETROCK brand gypsum panels, FIRECODE C core—95SJ16 steel joists 24" o.c.—1/2" T&G plywd fir att to joists with Type S-12 screws 24" o.c.—dbl layer gypsum panel clg att to RC-1 chan screw att to joists 16" o.c.—base panels att with 1" Type S screws 24" o.c.—face panels att with 1 1/2" Type G screws 8" o.c. at butt joints, 1 1/2" Type S screws 12" o.c. in field—joints fin— UL Des L527	48 51		USG-771101 Based on carpet & pad— SA-781110	C
2 hr.		1/2" SHEETROCK brand gypsum panels, FIRECODE C core—72SJ18 steel joists 24" o.c.—2" conc fir on corrug steel deck—met fur chan 24" o.c. clip-att joist—1" THERMAFIBER insul laid over chan below joists—panels screw-att to chan 12" o.c.—joints fin— UL Des G533				D
2 hr.		1/2" SHEETROCK brand gypsum panels, FIRECODE C core—75SJ18 steel joists 24" o.c.—2 1/2" conc fir over corrug steel deck—dbl layer gypsum panel ceiling—base panels att with 1" Type S-12 screws 12" o.c.—face panels att with 1 1/2" Type S-12 screws 12" o.c.—joints stag and fin—est. fire rating based on witnessed laboratory test	44 47	73	KAL-443533 Based on carpet & pad— KAL-443680 Based on RC-1 resil chan 24" o.c.— KAL-443534	E

†Fire ratings apply when assemblies are constructed with framing members having heavier gauge and/or larger dimensions.

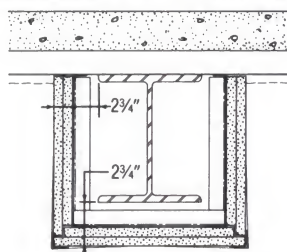
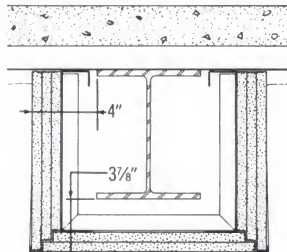
*Insulation may affect fire rating.

Columns



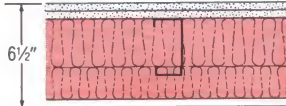
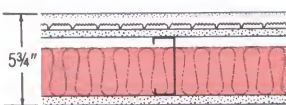
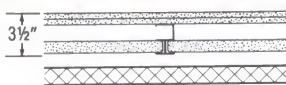
Fire rating	Column type	Fire-rated construction Detail & physical data	Description	Comments	System reference
2 hr.	W10 x49		Gypsum Drywall Fireprfg— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core, around col—double layer over ea flange end—double layer on flange faces separ by 158ST25 steel studs & screw att—met beads on corners—joints fin— UL Des X518		A
2 hr.	W14 X228		Gypsum Drywall Fireprfg— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core, around col—panels screw att to 158ST25 steel studs at col corners—met corner beads—joints fin— UL Des X521		B
2 hr.	varies		Gypsum Drywall Fireprfg—3 layers $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core, around col—triple layer over ea flange end—inner layers on flange face separ by 158ST25 steel studs & screw att—met beads on corners—joints fin— UL Des X524	Rating applies to tapered or constant-section prefabricated metal building columns	C
2 hr. & 3 hr.	W4x13 W6x15.5 W10x49		2-hr. gypsum drywall fireprfg—2 layers $\frac{1}{2}$ " SHEETROCK brand gypsum panels, ULTRACODE core, around col—panels screw att to 158ST25 steel studs at corners—met corner beads—joints fin— UL Des X528 3-hr. gypsum drywall fireprfg—3 layers $\frac{1}{2}$ " SHEETROCK brand gypsum panels, ULTRACODE core, around col, with second layer wrapped with no. 18 SWG steel wire spaced 24" o.c.—panels screw att to 158ST25 steel studs at corners—met corner beads—joints fin— UL Des X528		D E
3 hr.	W10 x49		Gypsum Drywall Fireprfg—3 layers $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core, around col—triple layer over ea flange end—inner layers on flange face separ by 158ST25 steel studs & screw att—met beads on corners—joints fin— UL Des X515		F
3 hr.	W14 X228		Gypsum Drywall Fireprfg— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core, around col—double layer over ea web face—panels screw att to 158ST25 steel studs at col corners—met corner beads—joints fin— UL Des X514		G
4 hr.	W14 X228		Gypsum Drywall Fireprfg—2 layers $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core, around col—panels screw att to 158ST25 steel studs at col corners—met corner beads—joints fin— UL Des X507		H

*Insulation may affect fire rating. See SA-905.

Beams

Fire rating	Beam type	Fire-rated construction Detail & physical data	Description & test no.	Comments	System reference
2 hr. (beam only)	W8 x24		Gypsum Drywall Caged Beam Fireprfg— $1\frac{1}{2}$ " steel run chan brackets 24" o.c.— $1\frac{1}{2}$ " x $\frac{1}{4}$ " corner angles att to chan brackets—dbl layer $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE core, att with Type S screws—met beads on corners—joints fin— $2\frac{1}{2}$ " conc deck on fluted steel fir— UL Des N501—UL Des N502	Design N502 based on $1\frac{1}{2}$ " steel runner for corner angles and coped brackets	A
3 hr. (beam only)	W8 x24		Gypsum Drywall Caged Beam Fireprfg— $1\frac{1}{2}$ " steel run chan brackets 24" o.c.— $1\frac{1}{2}$ " x $\frac{1}{4}$ " corner angles att to brackets—3 layers $\frac{3}{8}$ " SHEETROCK brand gypsum panels, FIRECODE core, att with Type S screws—1" 20-ga. hex mesh on bottom over middle layer—met beads on corners—joints fin— $2\frac{1}{2}$ " conc deck on fluted steel fir— UL Des N505	Extends drywall use to beam protection. Fire rating for restrained assembly; 2-hour rating for unrestrained assembly	B


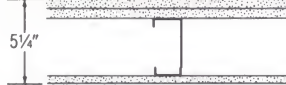
Non-Load Bearing Exterior Curtain Walls

Fire rating*	Fire-rated construction Detail & physical data	Description & test no.	System reference
1 hr.		35SJ20 steel studs 24" o.c.—1/2" SHEETROCK brand gypsum sheathing—1" extruded polystyrene insulation installed horizontally—3/4" cedar plywood exterior—3/4" THERMAFIBER fire safety FS-15 blankets between studs—3/4" SHEETROCK brand gypsum panels, FIRECODE C core, interior—joints fin— CEG 12-7-79	A
1 1/2 hr.		Glass-fiber reinforced concrete panels, 6'8 1/2" x 7'0", 1/2" thick, bolted to frame—40SJ16 steel studs 16" o.c. anchored to panel—5" THERMAFIBER CW-40 curtain wall insulation in cavity—1/2" SHEETROCK brand gypsum panels, FIRECODE C core, interior screw-attached to studs—joints finished— CEG 2-3-82	B
2 hr.		Glass-fiber reinforced concrete panels, 6'8 1/2" x 7'0", 1/2" thick, bolted to frame—40SJ16 steel studs 16" o.c. anchored to panel—5" THERMAFIBER CW-40 curtain wall insulation in cavity—double-layer 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, interior—joints finished— CEG 4-23-82	C
2 hr.		358ST20 steel studs 16" o.c.—1/2" SHEETROCK brand gypsum sheathing—self-furring metal lath—1" cement-lime stucco exterior 3" THERMAFIBER fire safety FS-15 blankets between studs—1/2" SHEETROCK brand gypsum panels, foil-back, FIRECODE C core, or IMPERIAL FIRECODE C gypsum base and 1/8" IMPERIAL finish interior— T-4851-OSU	D
2 hr.		C-H stud system—1" SHEETROCK brand liner panels set between USG steel C-H studs on exterior—2 layers SHEETROCK brand gypsum panels, FIRECODE C core, screw attached on interior—joints finished— U of C 4-2-75**	E

*Fire ratings apply when assemblies are constructed with framing members having heavier gauge and/or larger dimensions.

**Fire rating also applies with IMPERIAL FIRECODE C Base and veneer finish surface.

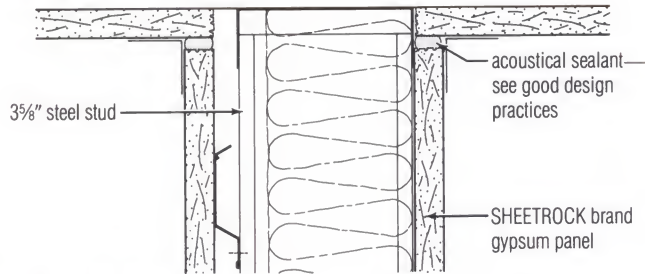
Load-Bearing Exterior Walls

Fire rating	Fire-rated construction Detail & physical data	Description	Acoustical performance		System reference
			STC	Description & test no.	
1 hr.		3/4", 20-ga. studs 24" o.c.—1/2" gypsum sheathing—1" extruded polystyrene insulation installed horiz—1/2" cedar plywood exterior—3/4" THERMAFIBER FS-15 insul bkts betw studs—1/2" SHEETROCK brand gypsum panels, FIRECODE C core, interior— load bearing up to 60% allowable stud axial load—CEG 12-7-79			A
1 1/2 hr.*		1/2" gysum sheathing exterior—3/4", 20-ga. studs 24" o.c.—dbl layer 1/2" SHEETROCK brand gypsum panels, FIRECODE core, interior—base layers att with 1" Type S-12 screws 12" o.c.—face layers att with 1 1/2" Type S-12 screws 12" o.c.— load bearing up to 100% allowable stud axial load—UL Des U425			B

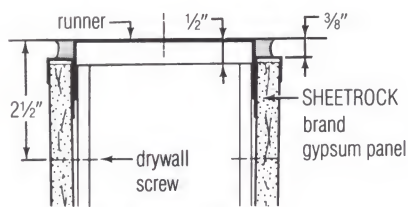
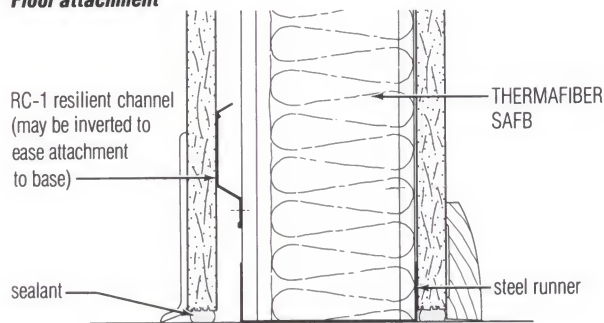
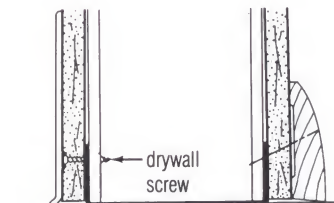
*Rating applicable to fire exposure on interior face only.

Partitions

Ceiling attachment



Floor attachment

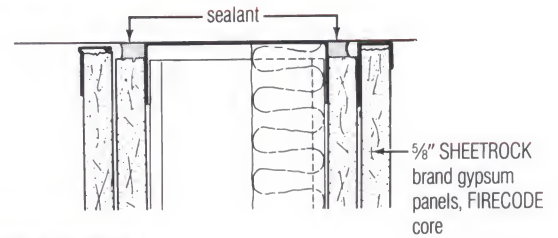
Perimeter relief
ceiling intersection

Top set

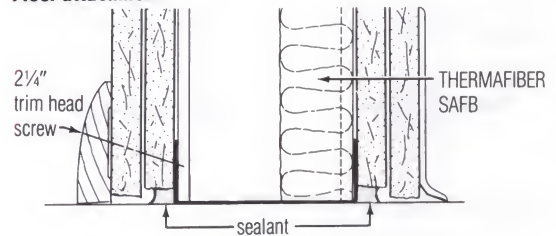
Wood

Ceiling attachment

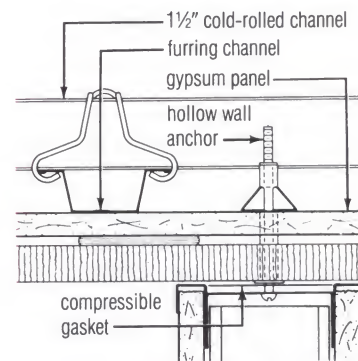
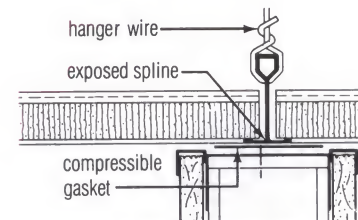
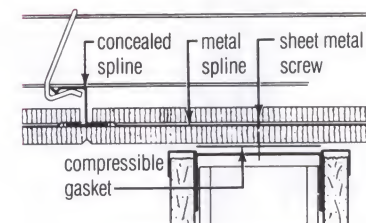
Scale: 3" = 1'-0"



Floor attachment

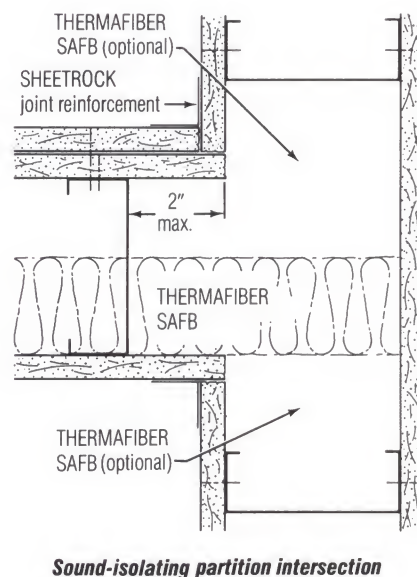
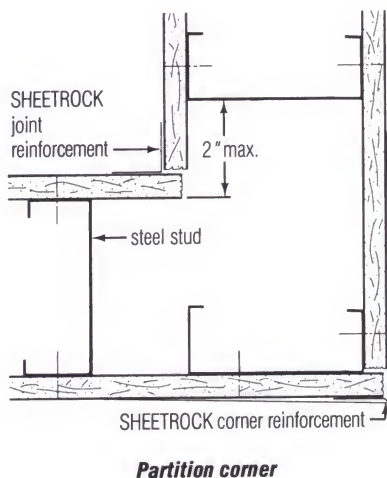
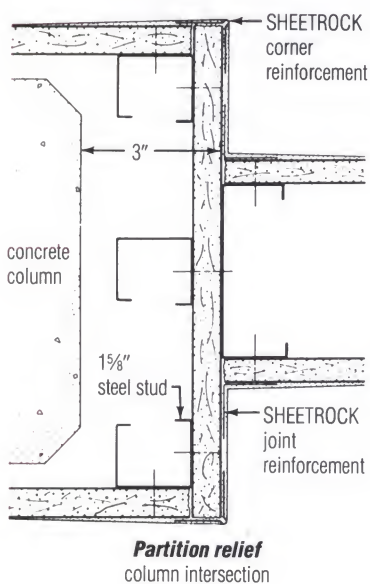
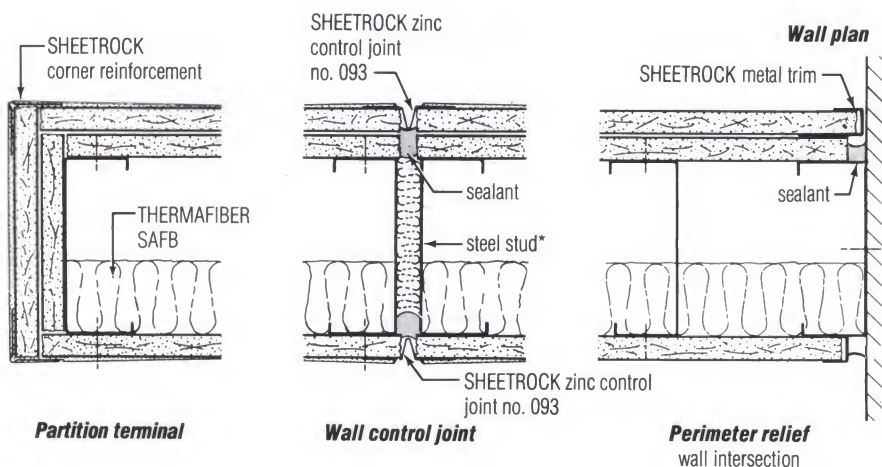


Attachment of partition to ceiling

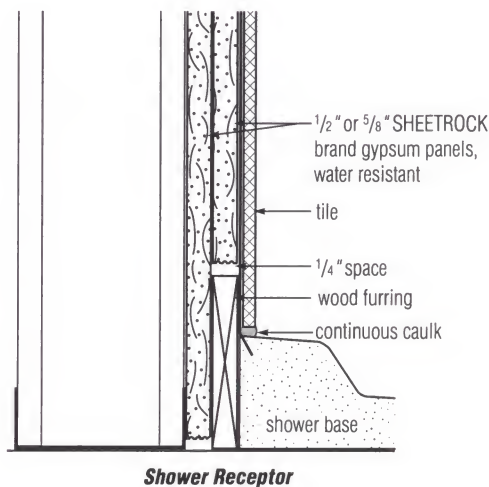
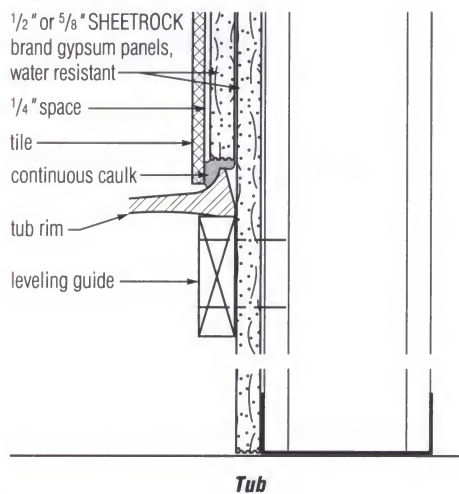
Adhesively applied
acoustical tileExposed grid system
for acoustical tile and boardConcealed grid system
for acoustical tile

Partitions

Scale: 3" = 1'-0"

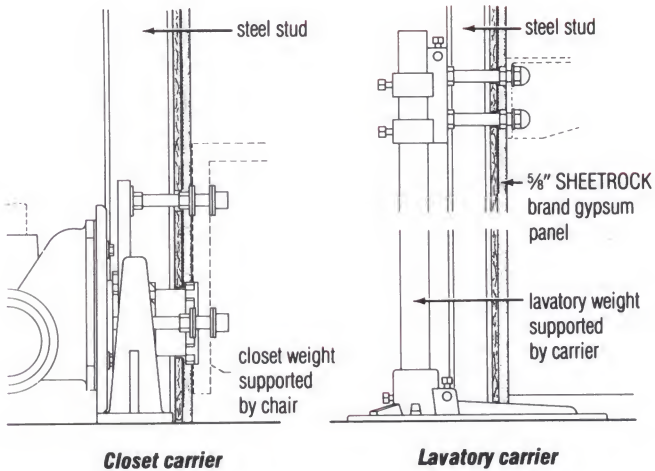


Double-layer panels



Scale: 3" = 1'-0"

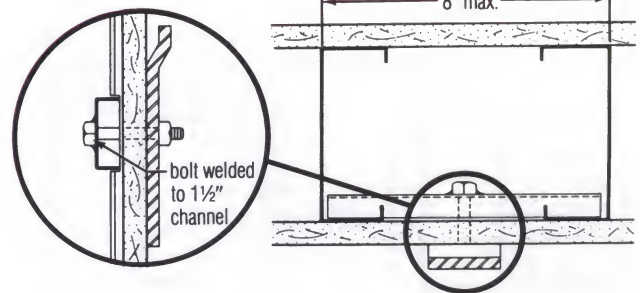
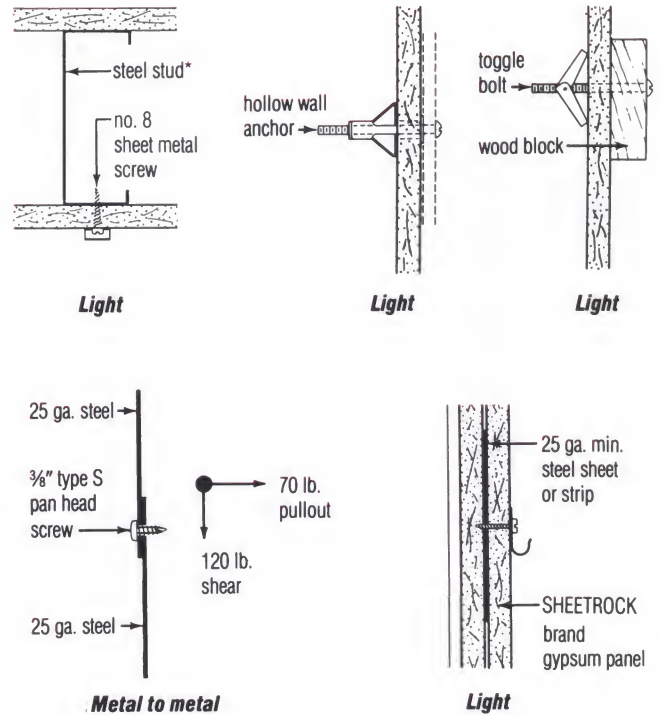
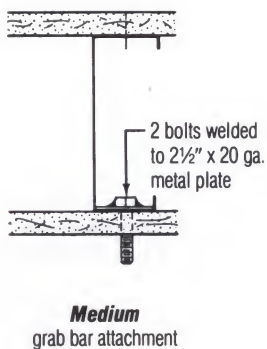
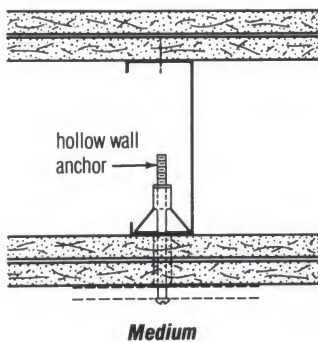
Fixture Attachment



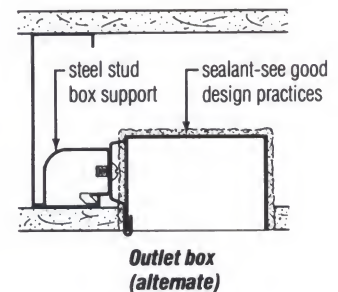
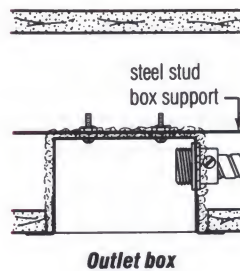
Load table

Fastener			Base assembly	Allowable withdrawal resistance		Allowable shear resistance	
Type	Size			lb	N ⁽¹⁾	lb	N ⁽¹⁾
	in	mm					
toggle bolt or hollow wall anchor	3/8	3.18	1/2" gypsum panel	20	89	40	178
	5/16	4.76		30	133	50	222
	1/4	6.35		40	178	60	267
	3/8	3.18	1/2" gypsum panel & ST25 steel stud	70	311	100	445
	5/16	4.76		80	356	125	556
	1/4	6.35		155	689	175	778
no. 8 sheet metal screw			1/2" gypsum panel & ST25 steel stud or 25-ga. steel insert	50	222	80	356
Type S bugle head screw				60	267	100	445
Type S-12 bugle head screw			1/2" gypsum panel & ST20 steel stud or 20-ga. steel insert	85	378	135	600
3/8" Type S pan head screw			25-ga. steel to 25-ga. steel	70	311	120	534
Type S-12			20-ga. steel to 20-ga. steel	53	235	133	591
two bolts welded to steel insert	5/16	4.76	see grab bar attachment below	175	778	200	890
	1/4	6.35		200	890	250	1112
bolt welded to 1 1/2" chan.	1/4	6.35	see plumber's bracket below	200	890	250	1112

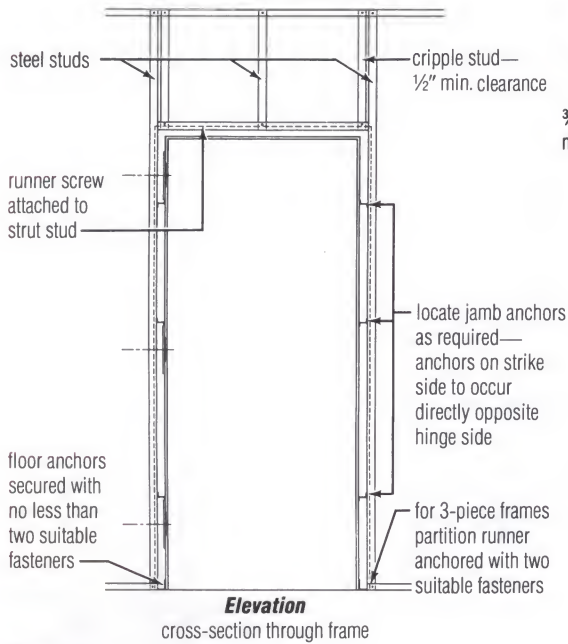
(1) Newtons



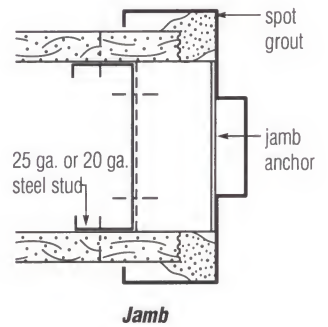
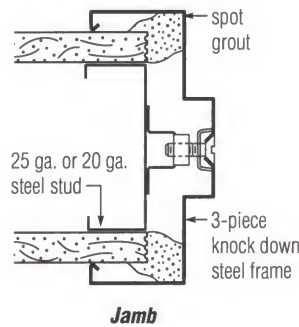
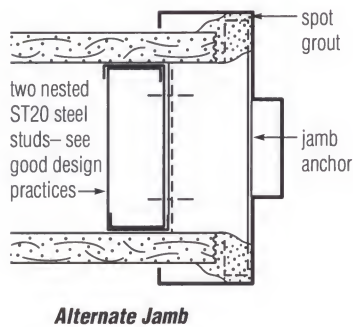
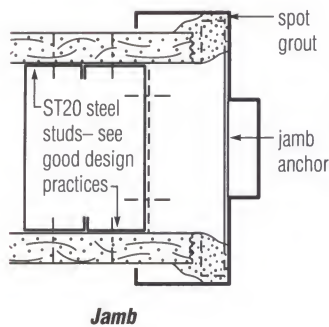
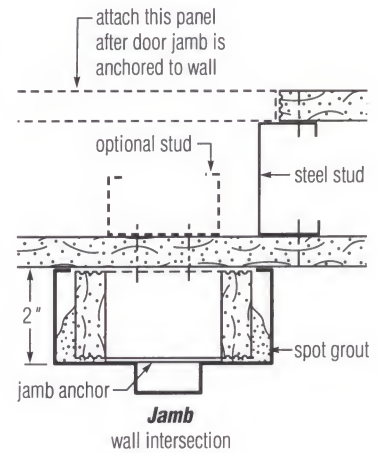
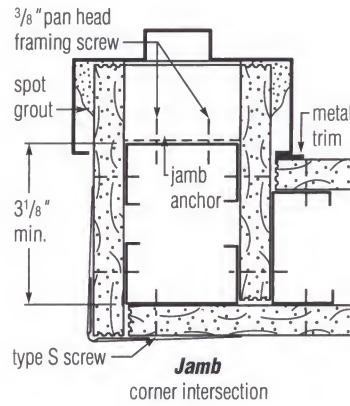
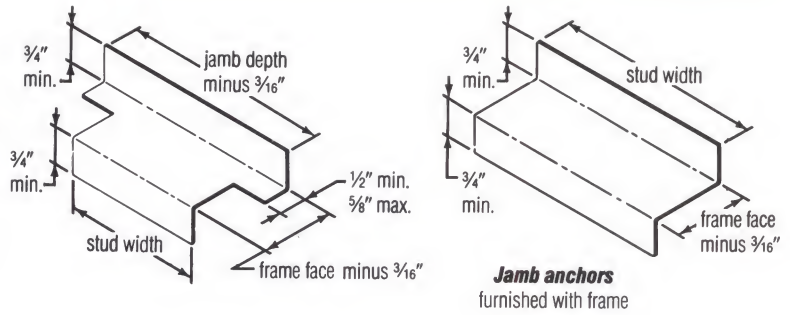
Outlet Boxes



Door Frames and Control Joints



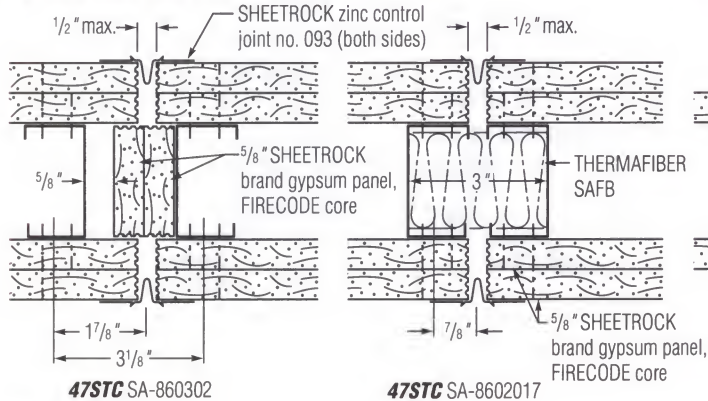
Note: In long runs treat window openings in same manner as doors



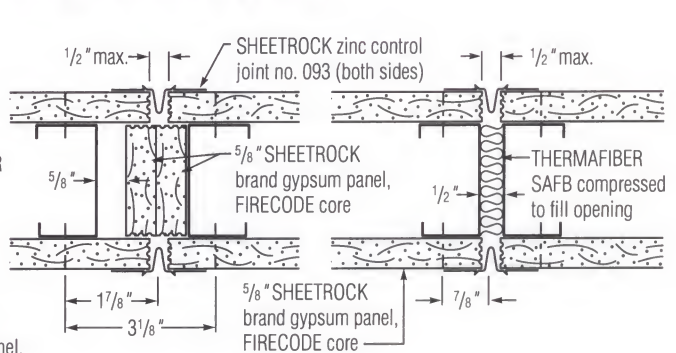
Fire-Rated Control Joints

(WHI-495-PSV-0824, 0824A)

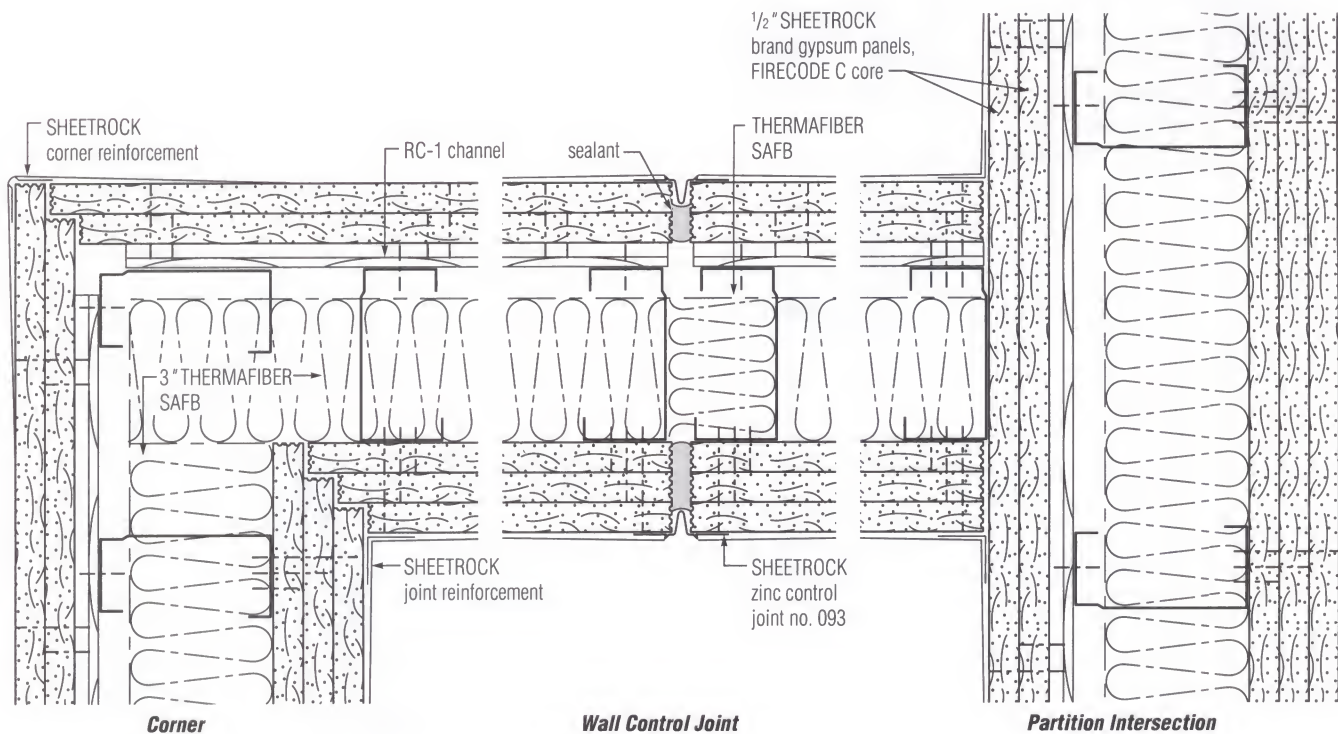
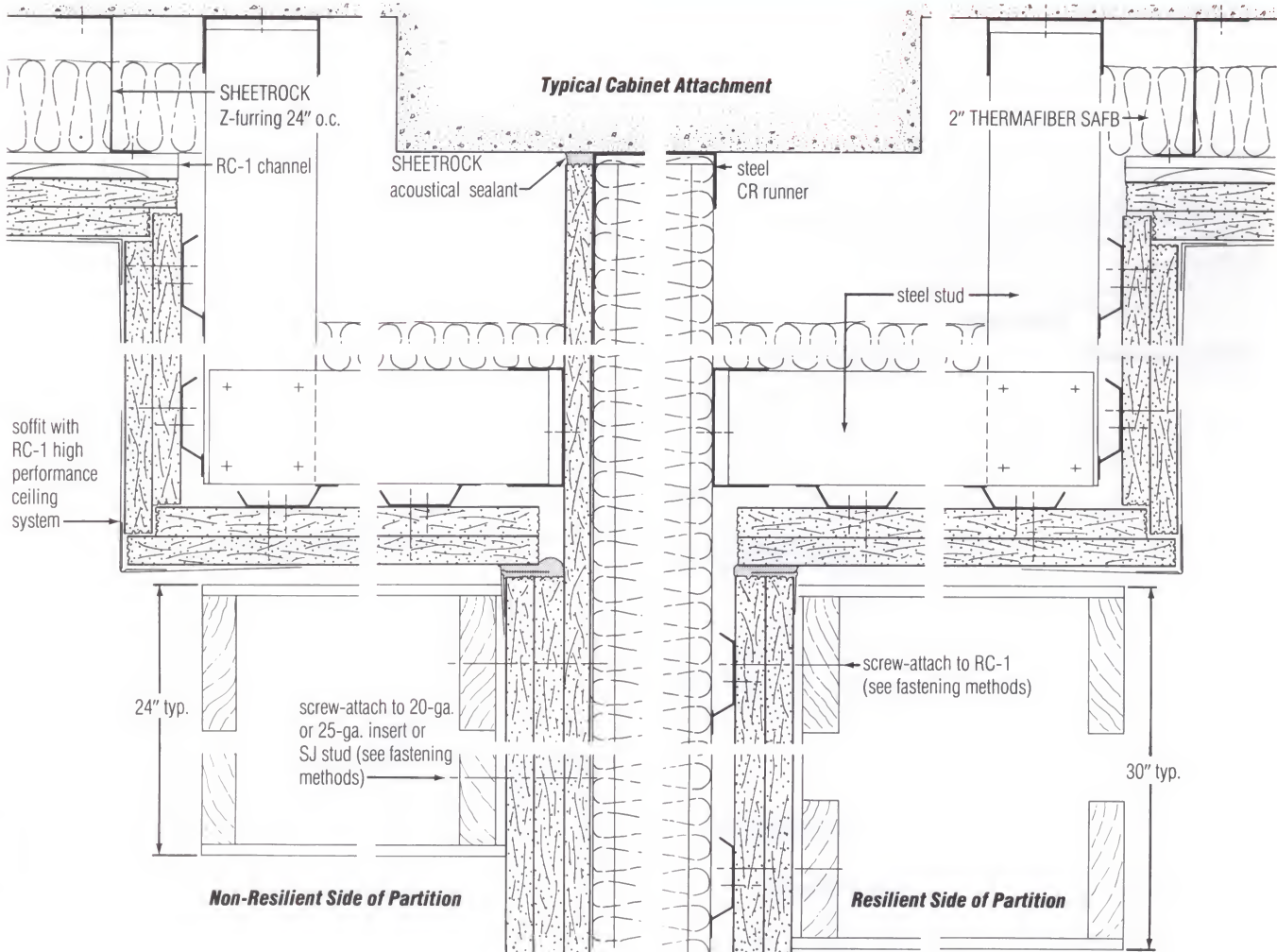
Two-hour rated steel stud partitions



One-hour rated steel stud partitions

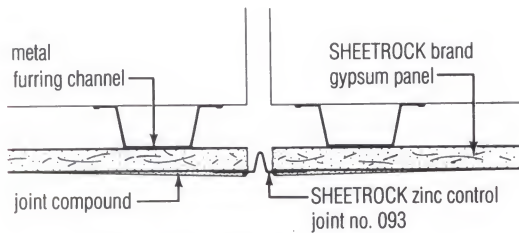


High Performance Sound Control



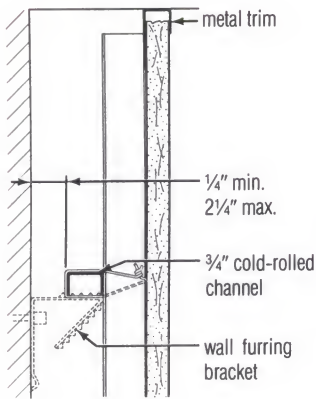
Wall Furring

Scale: 3" = 1'-0"

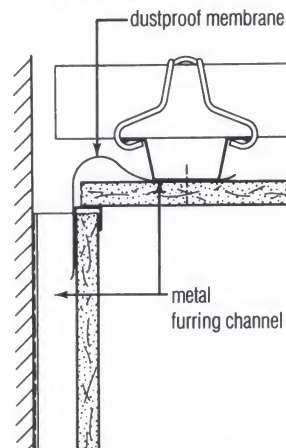


Control joint

Ceiling attachment

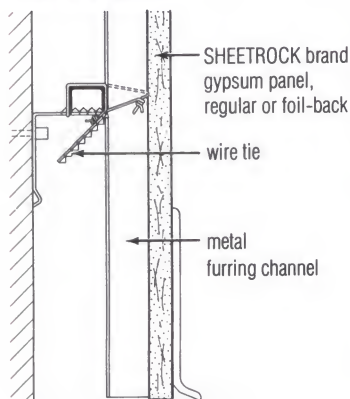


Ceiling attachment

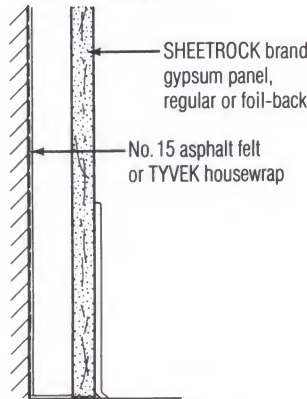


Suspended ceiling

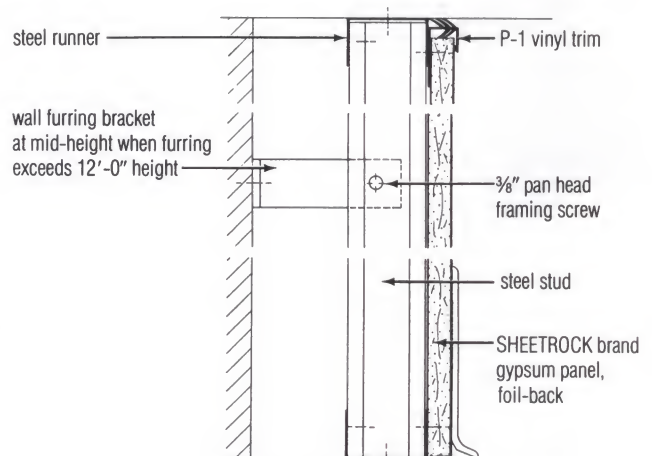
Floor attachment



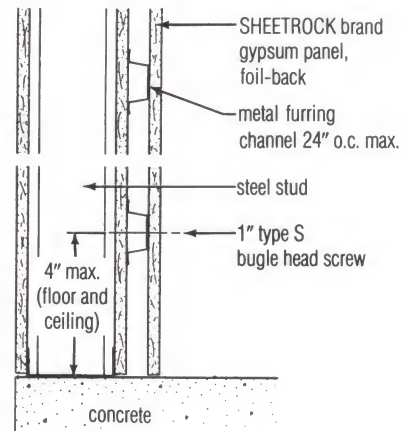
Floor attachment



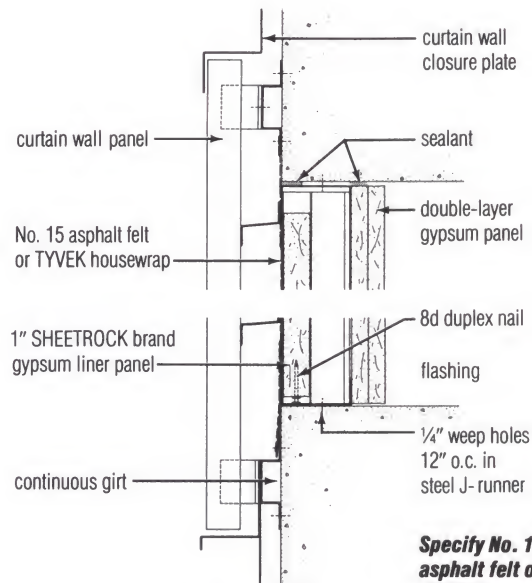
Direct furring



Free standing furring



Furred wall

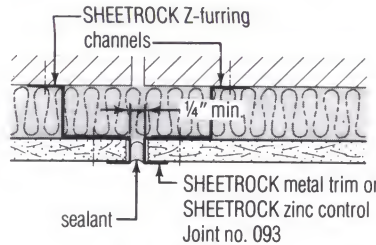
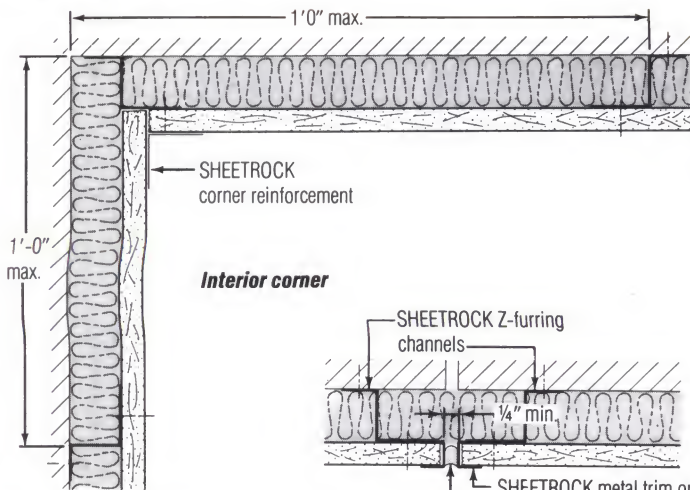


USG C-H stud

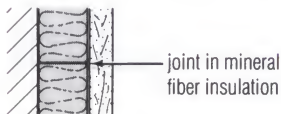
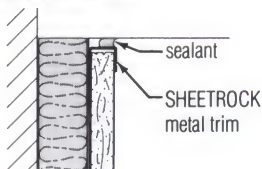
Specify No. 15 asphalt felt or TYVEK housewrap over entire sheathing area

Scale: 3" = 1'-0"

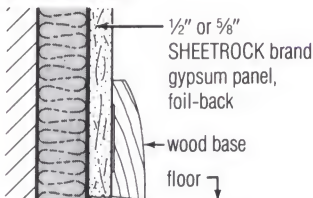
Wall Furring



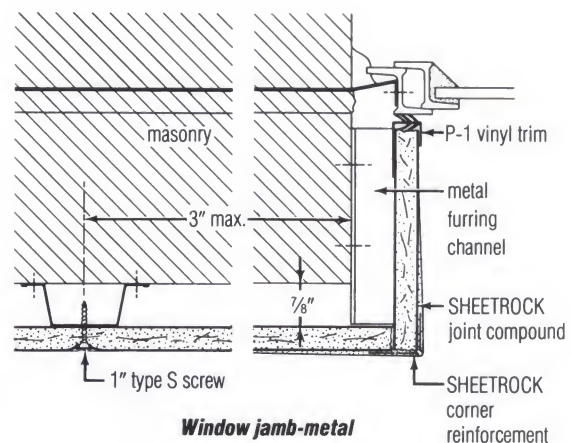
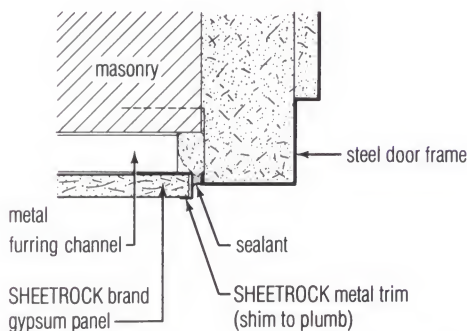
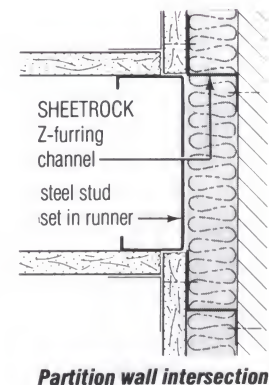
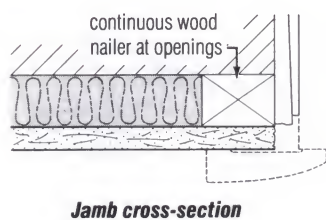
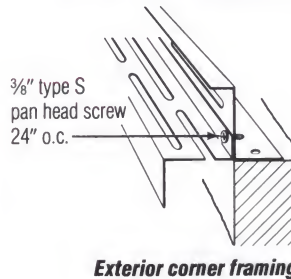
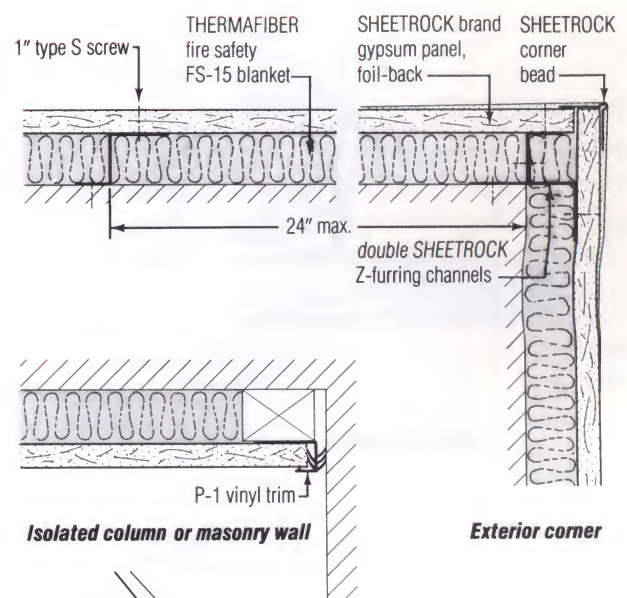
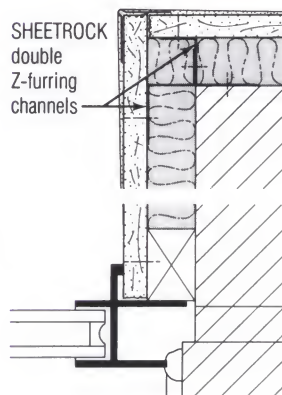
Ceiling attachment



Floor attachment

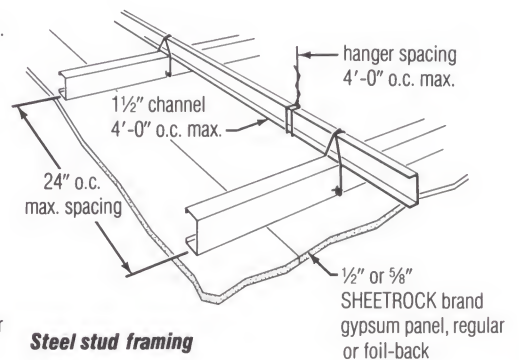
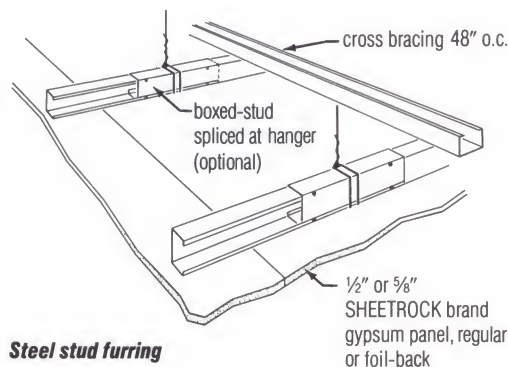
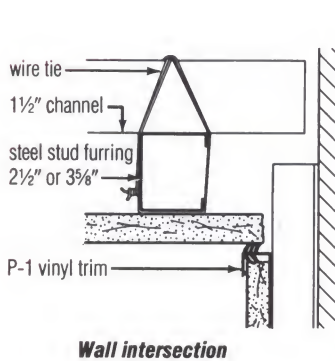
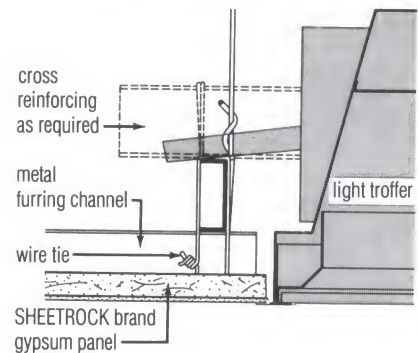
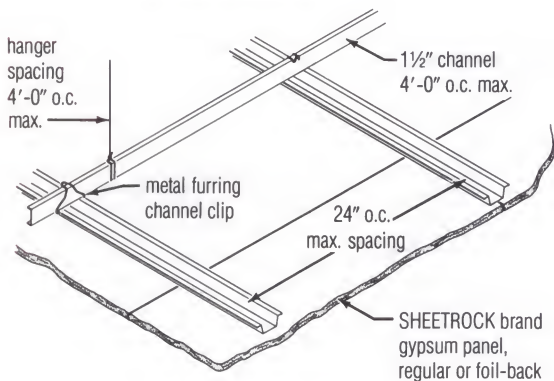
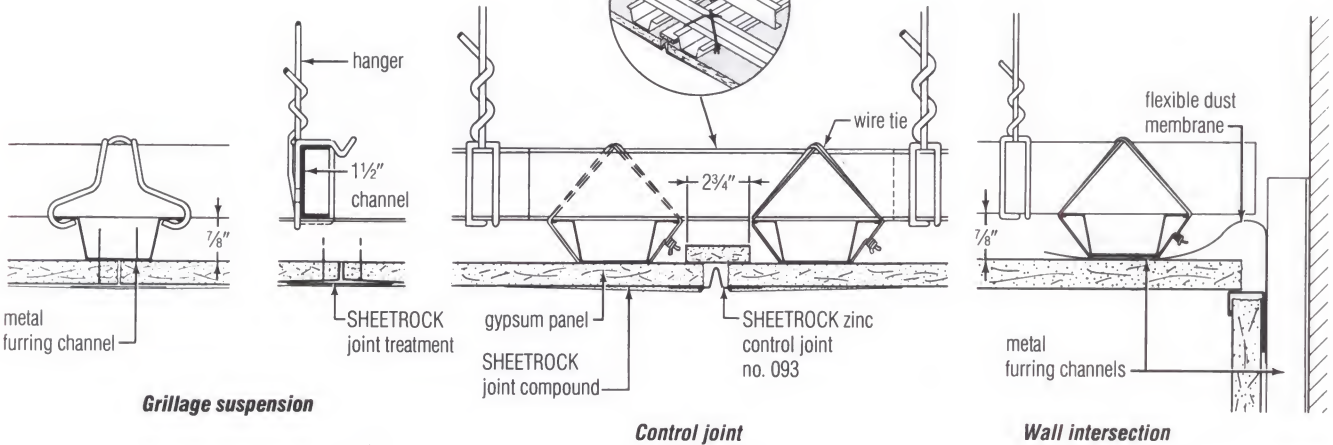


Note: details apply to rigid foam insulation and THERMAFIBER fire safety FS-15 blanket

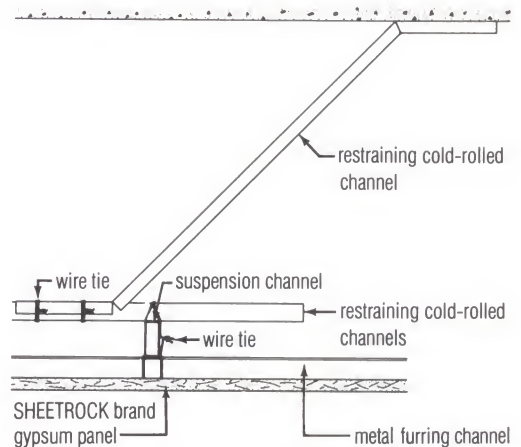
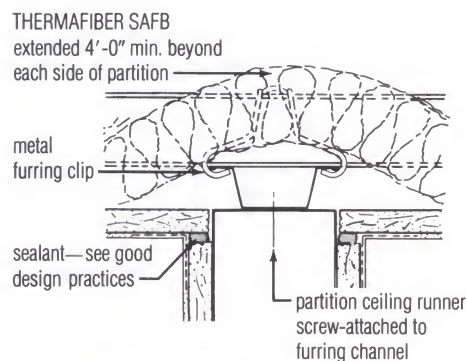
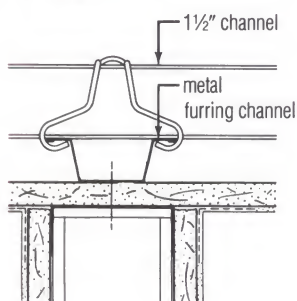


Ceilings

Scale: 3" = 1'-0"



Partition attachment at ceiling

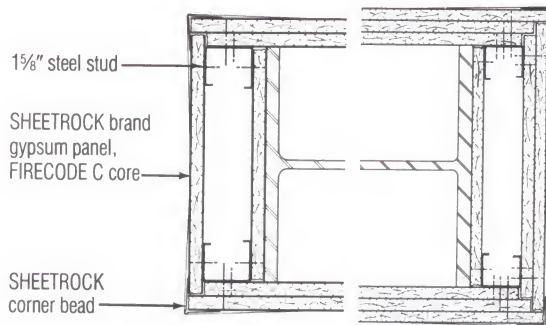


Continuous ceiling

Sound isolating interrupted ceiling

Optional bracing for lateral ceiling loads

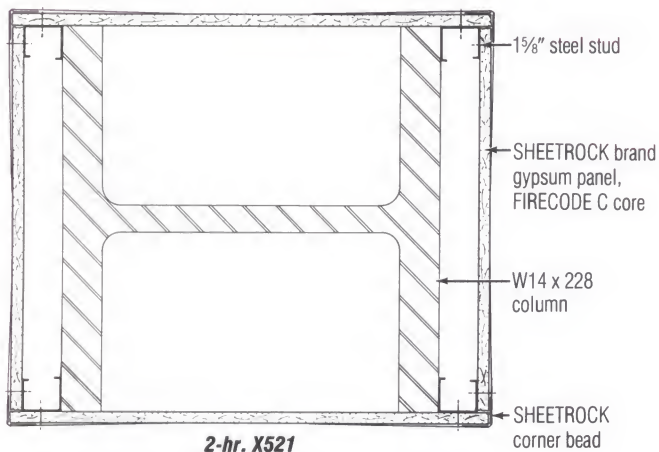
Column Fireproofing



2-hr. X518

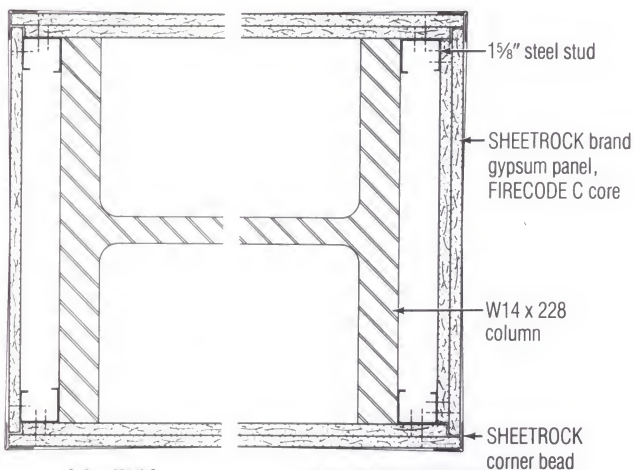
3-hr. X515

UL designs



2-hr. X521

UL design



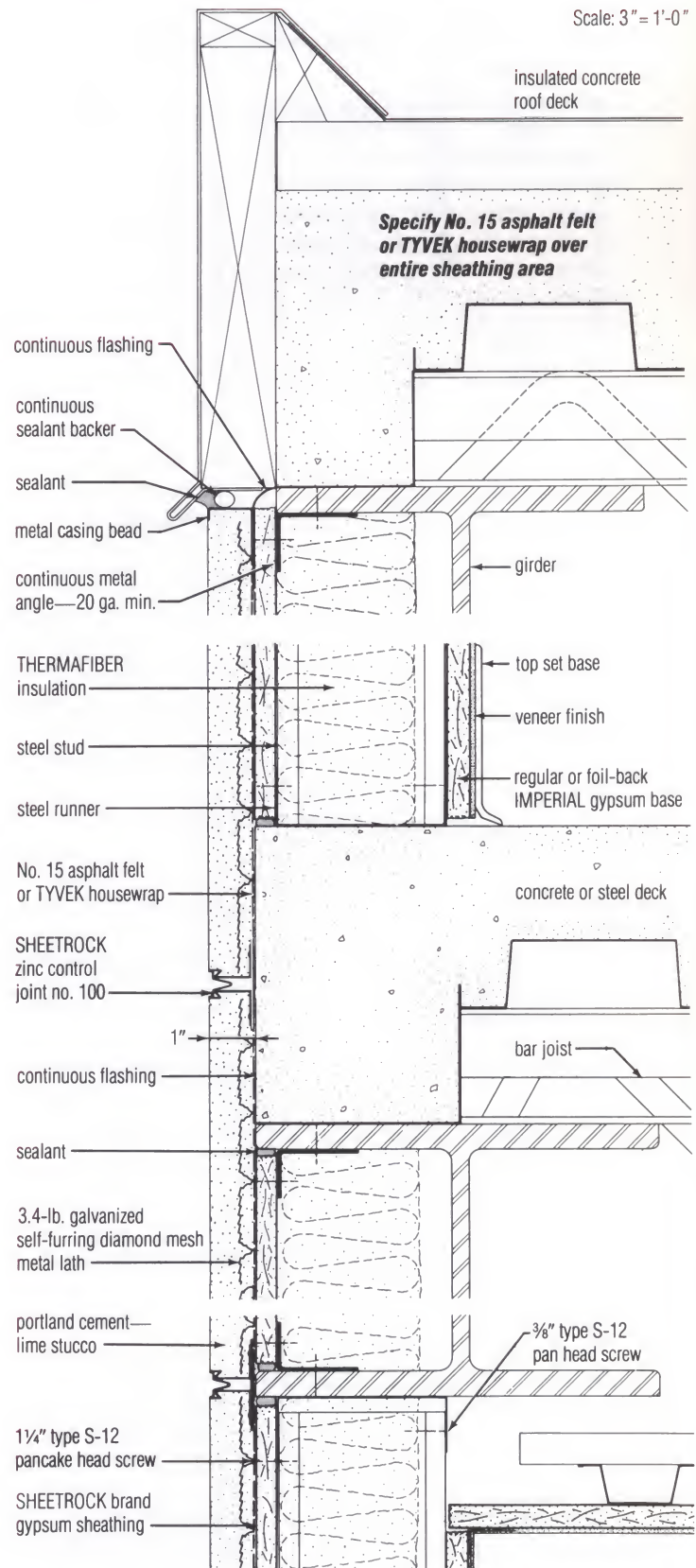
3-hr. X514

4-hr. X507

UL designs

Curtain Walls

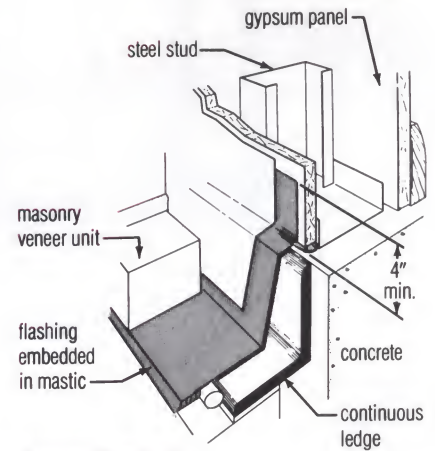
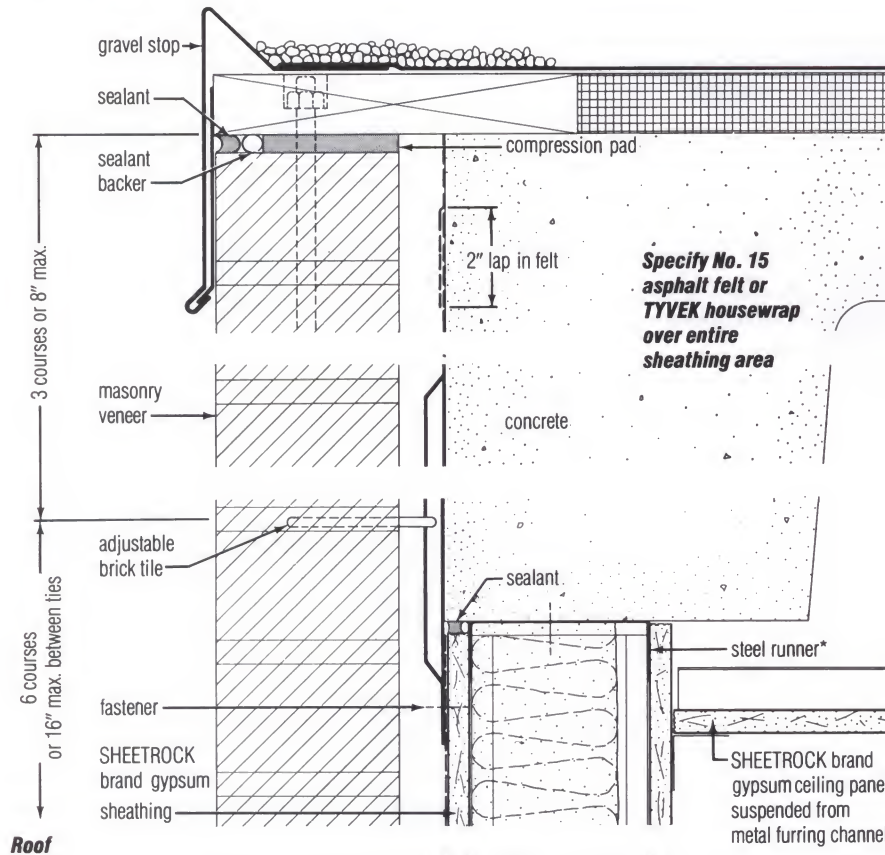
Scale: 3" = 1'-0"



Intermediate floor

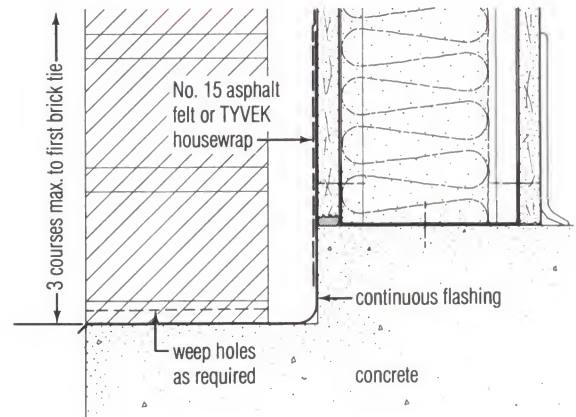
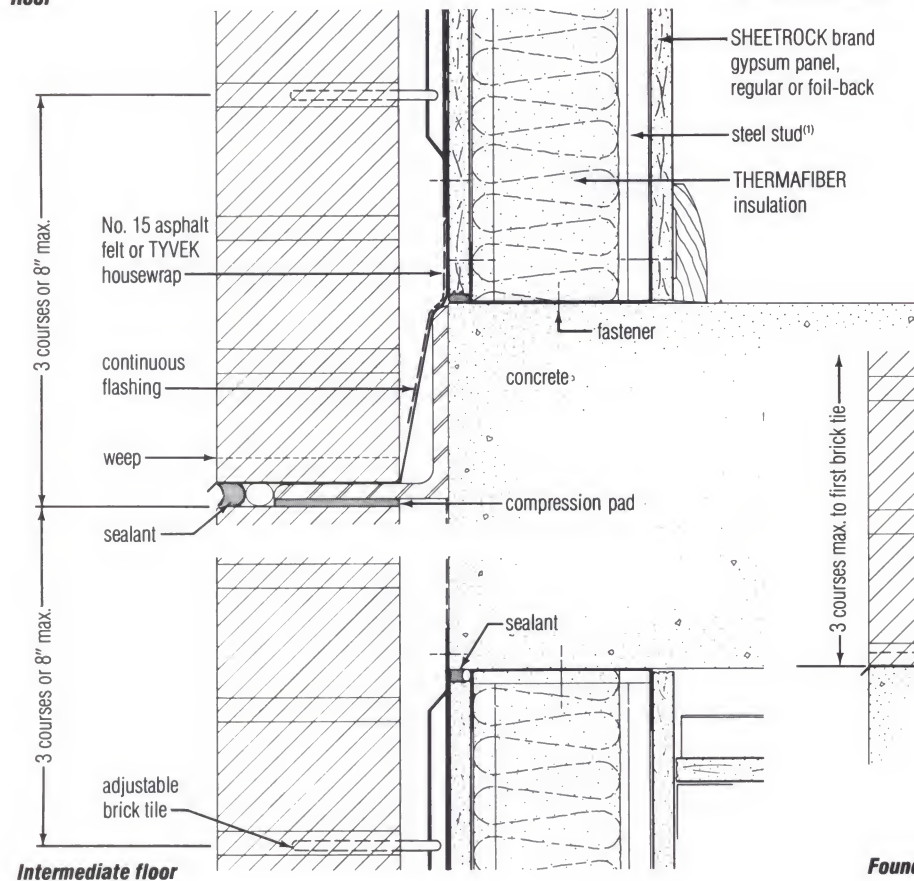
Curtain Walls

Scale: 3" = 1'-0"



Note: Consult BIA technical note 28B, revised February 1987, for framing recommendations for brick veneer buildings exceeding three stories in height.

(1) **Note:** The architect and/or structural engineer shall determine appropriate selection and placement of brick ties, flashing, weep holes, wall cavity width, masonry bridging requirements, mortar selection, and workmanship requirements.



Good Design Practices— Interior Steel Framed Walls and Ceilings

1 System Performance—United States Gypsum Company will provide test certification for published fire, sound and structural data covering systems designed and constructed according to its published specifications. Tests are conducted on company products assembled to meet performance requirements of established test procedures specified by various agencies. *System performance following substitution of materials or compromise in assembly design cannot be certified; failure may result under critical conditions.*

2 Shadowing and Spotting—Temperature differentials on the interior surface of exterior walls may result in collection of airborne dirt on the colder surface areas. Consequently accumulated dirt in the form of shadowing and spotting may occur at locations of fasteners or framing where surface temperatures usually are lowest. This is a natural phenomenon which occurs through no fault of the products.

Where temperature, humidity and soiling conditions are expected to cause objectionable shadowing and spotting, one of the following alternatives should be considered:

- A** The interior facing of SHEETROCK brand Gypsum Panels, Foil-Back, should be furred from the exterior wall studs using a base layer of panels screw-attached to the studs and horizontally applied metal furring channels spaced 24" o.c. (see detail, page 30).
- B** On exterior masonry walls, install rigid or semi-rigid insulation between SHEETROCK Z-Furring Channels affixed to interior side of wall and finish with SHEETROCK brand Gypsum Panels, Foil-Back, (see detail, page 28).
- C** For maximum resistance to shadowing and spotting, a separate free-standing wall construction is recommended using studs that are independent of the exterior wall.

3 Control Joints—Location of control joints is the responsibility of the design professional/architect. Gypsum panel surfaces should be isolated with control joints or other means where:

- A** partition, furring or column fireproofing abuts a structural element (except floor) or dissimilar wall or ceiling;
- B** ceiling or soffit abuts a structural element, dissimilar wall or partition or other vertical penetration;
- C** construction changes within plane of partition or ceiling;
- D** partition or furring run exceeds 30';
- E** ceiling dimensions exceed 50' in either direction with perimeter relief, 30' without relief;
- F** exterior soffits exceed 30' in either direction;
- G** wings of "L," "U" and "T"-shaped ceiling areas are joined;
- H** expansion or control joints occur in the exterior wall.
- I** Less-than-ceiling height frames should have control joints extending to the ceiling from both corners. Ceiling height door frames may be used as control joints. Treat window openings in same manner as doors.

SHEETROCK Zinc Control Joints, when properly insulated and backed by gypsum panels, have been fire-endurance tested and are certified for use in one- and two-hour fire-rated walls (see page 10 for construction details).

4 Metal Door and Borrowed-Light Frames should be at least 18-ga. steel, shop primed, and have throats accurately formed to overall thickness of partition. They should be anchored at floor with 16-ga. steel plates welded to trim flanges, with provision for two power-driven anchors or equal per plate. Jamb anchors should be 18-ga. steel welded in a jamb (see details, page 10). Stud reinforcing described below is screw-attached to jamb anchors. Three-piece frames may also be used with these partitions provided end of partition floor runner is anchored with two suitable fasteners.

For standard doors up to 3'0" wide weighing not more than 100 lb., ST25 steel studs and runners may be used for framing the opening. For doors 2'8" to 4'0" wide (200 lb. max.) rough framing should be ST20 studs (3/8" min.) and runners. For heavy doors up to 4'0" wide (300 lb. max.), two ST20 studs should be used (see details, page 10). For doors over 4'0" wide, double doors and extra-heavy doors (over 300 lb.), framing should be specially designed to meet load conditions.

For added door frame restraint, spot-grouting at the jamb anchor is suggested but not required. Apply SHEETROCK Setting-Type (DURABOND) Joint Compound just before inserting board into frame; do not terminate gypsum panel against trim return. Consult with door frame manufacturer for other requirements.

5 Pipe and Conduit Chases—Additional chases can be provided in steel studs by cutting round holes up to 3/4 of stud width, spaced 12" apart.

6 Ceramic Tile—SHEETROCK brand Gypsum Panels, Water-Resistant, or DUROCK Cement Boards are recommended as a base on walls for adhesive application of ceramic and plastic tile and plastic-faced wall panels. Double-layer panels are required for resilient systems.

7 Fixture Attachment—Lightweight fixtures should be installed with toggle bolts or hollow wall anchors inserted in the panel and preferably, also through the stud. Wood or metal mounting strips for cabinets and shelving should be bolted to the stud framing (see page 13).

8 Wood Base—Apply with trim head screws placed at each stud and midway between studs (12" o.c.).

9 Sound Tests are conducted under ideal laboratory conditions per ASTM procedures. Comparable field performance depends on building design and careful attention to detailing and workmanship. Where these partitions are used for sound control, seal the partition perimeter with a 1/4" min. round bead of SHEETROCK Acoustical Sealant. Seal around all cutouts for lights, cabinets, pipes and plumbing, ducts and electrical boxes. Back-to-back penetrations of the diaphragm, flanking paths, door and borrowed-light openings should be avoided.

10 TEXTONE Vinyl-Faced Gypsum Panels—For adhesive applications, only water-based adhesives are recommended; other adhesives may not be compatible with the vinyl surface.

Where high humidity and temperature conditions predominate, the use and location of a vapor retarder should be determined by a qualified mechanical engineer to prevent moisture condensation within the wall and the resultant damage to the vinyl covering.

11 Ceilings—Spacing of hangers and channels is designed to support only the dead load. Heavy concentrated loads should be independently supported. Lighting fixtures or troffers, air vents and other equipment should be separately supported from the ceiling grid or structure above; gypsum panels will not support these items.

To prevent objectionable sag in new gypsum panel ceilings, the weight of overlaid unsupported insulation should not exceed 1.3 psf for 1/2" thick panels with frame spacing 24" o.c.; 2.2 psf for 1/2" panels on 16" o.c. framing (or 1/2" SHEETROCK brand Interior Gypsum Ceiling Board on 24" o.c. framing) and 5/8" panels 24" o.c.; 3/8" thick panels must not be overlaid with unsupported insulation. A vapor retarder should be installed in exterior ceilings, and the plenum or attic space should be properly vented.

During periods of cold or damp weather when a polyethylene vapor retarder is installed on ceilings behind the gypsum board,

it is important to install the ceiling insulation before or immediately after installing the ceiling board. Failure to follow this procedure may result in moisture condensation on the back side of the gypsum board, causing the board to sag.

Water-based textures, interior finishing materials and high ambient humidity conditions can produce sag in gypsum ceiling panels if adequate vapor and moisture control is not provided. The following precautions must be observed to minimize sagging of ceiling panels:

- A** Where vapor retarder is required in cold weather conditions, the temperature of the gypsum ceiling panels and vapor retarder must remain above the interior air dew point temperature during and after the installation of panels and finishing materials.
- B** The interior space must be adequately ventilated and air circulation must be provided to remove water vapor from the structure.

Most sag problems are caused by the condensation of water within the gypsum panel. The placement of vapor retarders, insulation levels and ventilation requirements will vary by location and climate and should be reviewed by a qualified engineer if in question.

- 12 Fire-Rated Ceilings**—To comply with UL Floor-Ceiling Designs G512 and G515, gypsum panel end joints should be aligned and backed by 2" or 2½" wide face panel strips respectively laid over the joints. Face panels should be fastened to continuous furring channels centered 2" or 3" either side of joints. For UL Designs J502, J503, and J504, end joints should be backed by 3" wide strips and furring channels centered 3¼" either side of joints.
- 13 Back-Blocking** of ceiling end joints is recommended when construction occurs during adverse job or weather conditions. Float end joints between furring channels and back-block joint with a continuous 8" face panel strip adhesively applied, or screw-attach floated ends to a 5' channel centered over joint.
- 14 Acoustical Tile**—Treatment of joints and screwheads with joint compound may be omitted where gypsum panels serve as a base for adhesively applied acoustical tile.
- 15 SHEETROCK brand Exterior Gypsum Ceiling Board**—Exposed surfaces should receive two coats of good quality exterior paint. First coat: oil-based primer; second coat: either alkyd or latex exterior paint.
- 16 Furring Systems**—Shallow electrical outlet boxes are recommended when insulation less than 1½" thick is used.
- 17 Warning: Combustible.** Rigid foam (cellular plastic) insulation will ignite if exposed to fire of sufficient heat and intensity. Use only as directed by the specific instructions accompanying the product.
- 18 High-Rise Buildings**—Variable wind pressure can cause a structure to drift or sway. This can result in movement of the non-load bearing partitions, thus causing noise. United States Gypsum Company assumes no responsibility for the prevention, cause, or repair of these job-related noises.
- 19 Additional Information**—For additional information and product limitations, see technical folders in this series: *Construction Selector SA-100* for fire and sound-rated systems; *Gypsum Panels and Accessories Folder SA-927* for information on system components; *Texture and Finish Products Folder SA-933* for finishing product specifications; *Plaster Systems Folder SA-920* for information on veneer finish products; *DUROCK Cement Board Folder SA-932* for data on ceramic tile base.

Good Design Practices—

Exterior Steel Framed Walls and Ceilings

1 System Performance—These design practices are for exterior non-load bearing curtain wall systems using steel framing and securely attached interior and exterior facings. They are presented as a general guide to the architect or structural engineer in preparing project specifications. The architect and/or structural engineer must determine what specific products and systems are appropriate for use in a given structure.

United States Gypsum Company will provide test certification for published fire and sound data covering products used according to its published specifications. Tests are conducted on United States Gypsum Company and Unimast Incorporated products assembled to meet performance requirements of established test procedures specified by various agencies. *System performance following any substitution of materials or compromise in assembly design cannot be certified and may result in failure under critical conditions.*

- 2 Design Considerations**—Simple span limiting heights for SJ studs found in tables are calculated assuming web crippling strength based on test data for studs with min. 10" length of unpunched web steel at both ends of member, for 20-ga. and 18-ga. members having equal stud and runner gauge thickness, and for 16-ga. and 14-ga. studs using 18-ga. runner and with the physical and structural properties described. When field cuts reduce this minimum 10" unpunched steel, web stiffening may be required. For simple span limiting heights based on stud properties only, table values assume full lateral bracing of both stud flanges. Recommendations contained herein cover brick veneer that is structurally supported at every floor with a soft joint below the ledger angle or veneer that is designed per the Brick Institute of America Technical Notes 28 and 28B. Adjustable masonry ties are recommended when continuous brick veneer must be isolated from the structural elements. For low-rise construction and where vertical displacement is not a problem as determined by the architect and/or structural engineer, an 18-ga. galvanized corrugated tie may be determined to be suitable. In all continuous curtain wall by-pass construction, contact United States Gypsum Company for slide clip, welding, load and all property and framing performance data.
- 3 Fasteners**—Specify drywall screws for 25-ga. to 20-ga. steel framing. Specify self-drilling screws for 20-ga. to 14-ga. steel framing. On interior of exterior wall, specify Type S-12 for 20-ga. framing. Corrosion-resistant screws must be used for screw-attaching all sheathing, metal lath, brick ties and other exterior materials.
- 4 Window and Door Openings**—Framing for window, door and other wall penetrations must have additional studs or reinforcement at the header, sill and jambs to transfer and support all applicable loads. Design should be checked for structural adequacy.
- 5 Shadowing**—Temperature differentials on the interior surface of exterior walls may result in collection of airborne dirt on the colder surface areas. Consequently accumulated dirt in the form of shadowing may occur at locations of fasteners or framing where surface temperatures usually are lowest. This is a natural phenomenon which occurs through no fault of the products. Where temperature, humidity and soiling conditions are expected to cause objectionable shadowing, one of the following alternatives should be considered:

A The interior facing of SHEETROCK brand Gypsum Panels, Foil-Back, should be furred from the exterior wall studs using a base layer of panels screw-attached to the studs and horizontally applied metal furring channels spaced 24" o.c.

B For maximum resistance to shadowing and spotting, a separate free-standing wall construction is recommended using studs that are independent of the exterior studs and membrane.

6 Expansion and Contraction—Location of control joints is the responsibility of the design professional/architect. Curtain wall surfaces should be isolated with control joints or other means where:

A curtain wall abuts a structural element (except floor) or dissimilar wall or ceiling;

B construction changes within the plane of the wall;

C stucco surfaces exceed 10' in either direction;

D the area within stucco sections exceeds 100 sq. ft.;

E as required for brick-veneer construction by the Brick Institute of America especially below ledger angle supports;

F basic construction contains a control joint;

G interior partition run exceeds 30';

H exterior soffits exceed 30' in either direction.

I Less-than-ceiling height frames should have control joints extending to the ceiling from both corners. Ceiling height door frames may be used as control joints. Treat window openings in same manner as doors.

Sheathing should be broken behind control joints. Where vertical and horizontal joints intersect, the vertical joint should be continuous and the horizontal joint should abut it. Splices, terminals and intersections should be caulked with a sealant.

Framing at control joints that extend through the wall should have 1½" cold-rolled channel alignment stabilizers spaced max. 5'0" vertically. Channels should be placed through holes in the stud web and be securely attached to the first stud either side of the control joint.

Control joint assemblies, suitable for wind pressures up to 40 psf, should meet ASTM E514, Class E water permeance requirements. Backing should have 6" wide horizontal overlap in the asphalt felt sheathing covering and 6" wide asphalt felt strips placed vertically behind the control joint (see page 26 for details).

7 Air and Water Infiltration—Flashing and sealants as shown in the construction documents and as selected by the architect and/or structural engineer should be provided to resist air and water infiltration. The flashing and sealants selected shall be installed in a workmanlike manner in appropriate locations to maintain continuity of air/water barriers, particularly at windows, doors and other penetrations of exterior wall. All gypsum sheathing must be covered with No. 15 asphalt felt or TYVEK Housewrap sheet to assure water-tight construction. Asphalt felt should be applied horizontally with 2" overlap and attached to sheathing. TYVEK sheet should be stapled to sheathing according to manufacturer's directions. Accessories for stucco finishes should be made of zinc alloy with weep holes 12" o.c.

8 Corrosive Materials—Zinc alloy accessories are recommended for exterior applications and where corrosion due to high humidity and saline content of aggregate is possible. Metal lath, control joints and other metal accessories, including zinc alloy accessories, should not be used with magnesium oxychloride cement stuccos or portland cement stucco with calcium chloride additives.

9 Prefinished Panels—Ceramic, aggregated or porcelain-enameled panels, metal siding and other dry exterior facings weighing up to 8 psf may be applied over gypsum sheathing and screw attached to studs. Use stainless steel screws, clips, hanger bars and fastening methods according to siding manufacturer's recommendations. Screws should not transfer more than 15 lb. panel weight per screw to studs. Screw lengths are based on panel thickness plus ¾".

10 Additional Information—See product folders in this series: *Gypsum Panels & Accessories Folder SA-927* for information on system components; *Texture and Finish Products Folder SA-933* for finishing specifications; *Plaster Systems Folder SA-920* for plaster system components and specifications; *THERMAFIBER Life Safety Fire Containment Systems Folder SA-707* for data on insulation and mineral fireproofing.

11 WARNING: COMBUSTIBLE. Rigid foam (cellular plastic) insulation will ignite if exposed to fire of sufficient heat and intensity. Use only as directed by the specific instructions accompanying the product.

12 High-Rise Buildings—Variable wind pressure can cause a structure to drift or sway. This can result in movement of the non-load bearing partitions, thus causing noise. United States Gypsum Company assumes no responsibility for the prevention, cause, or repair of these job-related noises.

13 Vapor Retarders—Vapor retarder is normally installed on the warm side of wall in cold climates to prevent interior moisture from entering the stud cavity. Where high humidity and temperature conditions predominate, the use and location of a vapor retarder should be determined by a qualified mechanical engineer to prevent moisture condensation within the wall. Vinyl wall coverings are not recommended for the interior of walls containing vapor retarders.

14 Note—United States Gypsum Company reserves the right to discontinue, make improvements in, or change materials and/or configurations of any of its products described in this Folder, without prior notice and without obligation to incorporate the changes or improvements in items already manufactured. Consult your United States Gypsum Company sales representative for current product information and details.

Part 1: General

1.1 Scope—Specify to meet project requirements.

1.2 Qualifications

All materials described in this Folder manufactured by or for United States Gypsum Company shall be installed in accordance with its current printed instructions.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Environmental Conditions

In cold weather and during gypsum panel joint finishing, temperatures within the building shall be maintained within the range of 50° to 70° F. (13° to 21° C). Adequate ventilation shall be provided to carry off excess moisture.

SHEETROCK Setting-Type Joint Compound and SHEETROCK Joint Tape shall be used on all joints and internal corners and allowed to set and dry thoroughly before plaster application when used in conjunction with veneer plaster over steel framing.

Part 2: Products

A Gypsum Panels

Interior Panels—(1/2") (5/8") thick, 48" wide, SHEETROCK brand (Regular) (FIRECODE) (FIRECODE C) Gypsum Panels, lengths as required.

—3/4" thick 48" wide, SHEETROCK brand Gypsum Panels, ULTRACODE Core, lengths as required.

—(3/8") (1/2") (5/8") thick, 48" wide, SHEETROCK brand Foil-Back (Regular) (FIRECODE) (FIRECODE C) Gypsum Panels, lengths as required.

—(1/2") (5/8") thick, 48" wide, SHEETROCK brand Water-Resistant (Regular) (FIRECODE) (FIRECODE C) Gypsum Panels, lengths as required.

—1/2" thick, 48" wide, SHEETROCK brand Interior Gypsum Ceiling Board, lengths as required.

—(1/2") (5/8") thick, 48" wide, TEXTONE (Regular) (FIRECODE C) Vinyl-Faced Gypsum Panels, lengths as required.

Plaster Bases—Foil-Back IMPERIAL Gypsum Base (for veneer plasters) 1/2" thick in Regular and FIRECODE C, 3/8" in Regular, FIRECODE, and FIRECODE C.

Exterior Panels—SHEETROCK brand Gypsum Sheathing—1/2" thick, (2', 4'x8'); (4'x9'); GYP-LAP Gypsum Sheathing—1/2" thick, (2'x8'), (4'x8', 9').

SHEETROCK brand Gypsum Liner Panels—1" thick, 2' x lengths to 14', (for use with C-H Stud Infill Panel System).

—(1/2") (5/8") thick, 48" wide, SHEETROCK brand (Regular) (FIRECODE) Exterior Gypsum Ceiling Board, lengths as required.

B Plasters

(specify plasters for interior surfaces from *Plaster Systems SA-920*).

C Interior Steel Studs and Runners

Steel Studs—158ST25 (1 3/8"), 212ST25 (2 1/2"), 358ST25 (3 5/8"), 400ST25 (4"), 600ST25 (6"), 212ST22 (2 1/2"), 358ST22 (3 5/8"), 400ST22 (4") 600ST22 (6"), 212ST20 (2 1/2") 358ST20 (3 5/8"), 400ST20 (4"), 600ST20 (6"), 362SJ20 (3 5/8"), 40SJ20 (4").

Steel Runners—158CR25 (1 3/8"), 212CR25 (2 1/2"), 358CR25 (3 5/8"), 400CR25 (4"), 600CR25 (6"), 212CR22 (2 1/2"), 358CR22 (3 5/8"), 400CR22 (4"), 600CR22 (6"), 362CR20 (3 5/8"), 400CR20 (4").

D Exterior Steel Studs and Runners

SJ Style Studs—362SJ20 (3 5/8"), 362SJ18 (3 5/8"), 362SJ16 (3 5/8"), 362SJ14 (3 5/8"), 40SJ20 (4"), 40SJ18 (4"), 40SJ16 (4"), 40SJ14 (4"), 60SJ20 (6"), 60SJ18 (6"), 60SJ16 (6"), 60SJ14 (6"), 725SJ18 (7 1/4"), 725SJ16 (7 1/4"), 725SJ14 (7 1/4") 80SJ18 (8"), 80SJ16 (8"), 80SJ14 (8")

Runners—Select CR-runner to match stud style. CR18 styles may be used with SJ16 and SJ14 studs.

E Metal Lath

3.4-lb. Galvanized Self-Furring Junior Diamond Mesh Lath, 27" x 96".

F Lathing Accessories

(specify from *Plaster Systems SA-920*; specify 1" exterior grounds; 1" casing beads available by special order from United States Gypsum Company).

G Steel Studs

USG Steel C-H Studs:

212CH25 (2 1/2")

212CH22 (2 1/2")

212CH20 (2 1/2")

400CH20 (4")

400CH25 (4")

600CH20 (6")

USG Double E Studs:

600ES25 (6")

600ES20 (6")

H Steel Runners

USG J-Runners:

212JR24 (2 1/2")

212JR20 (2 1/2")

400JR24 (4")

400JR20 (4")

600JR24 (6")

600JR20 (6")

I Screws

size: (3/8") (7/16") (1/2") (1") (1 1/4") (1 1/2") (1 3/4") (2") (2 1/4") (2 1/2") (3")

style: (framing—Type S or S-12)(drywall—Type S)(self-drilling—Type S-12)(laminating—Type G)(coarse thread—Type W) head: (bugle)(pan)(trim)(pancake)(low-profile)(mod. truss head) coating: (reg)(corrosion-resistant).

J Adhesives

SHEETROCK Setting-Type Joint Compound or SHEETROCK Ready-Mixed Joint Compound for double-layer application and column fireproofing (All Purpose) (Taping)

K Insulation

THERMAFIBER Fire Safety FS-15 Blankets—(3") (3 3/4") thick, (16") (24") wide x (48") (96") long or THERMAFIBER CW-40 Insulation (1") (1 1/2") (2") thick, (16") (24") wide x 60" long.

THERMAFIBER Sound Attenuation Fire Blankets—(1 1/2") (2") (3") thick, x(16"x48")(24"x48"). (Use where noncombustibility is required. Specify foil-back interior gypsum or foil-back IMPERIAL Base panels for vapor retarder.)

THERMAFIBER Safing Insulation—(2") (4") thick, 24" wide, () long, 4 pcf min. density, (with foil facing)(with galvanized steel impaling clips)(with fire-resistant adhesive).

THERMAFIBER CW-40 Curtain Wall Insulation—(2") (3") (4") thick, 24" wide, (36") (48") (60") long (Regular)(Foil-Faced).

L Metal Furring Materials

Metal Furring Channel (DWC-25)(DWC-20)

Metal Furring Channel Clip (use with DWC-25 only)

SHEETROCK Z-Furring Channel (1") (1 1/2") (2") (3")

RC-1 Resilient Channel

$\frac{3}{4}$ ", 1 $\frac{1}{2}$ " Cold-Rolled Channel (ptd)(galv)
Adjustable Wall Furring Bracket

M Metal Trim

SHEETROCK Metal Trim No. (200-A)(401)(402)(P-1)(801-A)
(801-B)

N Corner Reinforcement

(No. 103 DUR-A-BEAD Corner Bead)(No. 800 Corner Bead)

O Metal Angle

Metal Angle, 1 $\frac{1}{8}$ "x $\frac{7}{8}$ "x24-ga.

P Control Joint

SHEETROCK Zinc Control Joint No. 093

Q Hanger Wire

Galvanized Hanger Wire, 8-ga.

R Tie Wire

18-ga. Galvanized Tie Wire

S Joint Treatment

Specify Joint Treatment Systems for interior surfaces from *Gypsum Products, Systems & Accessories SA-919* (in Sweet's General Building and Renovation file, section 09250) or *Gypsum Panels & Accessories SA-927*.

T Exterior Stucco Finish and Stucco Lime

ORIENTAL Exterior Stucco

BONDCRETE Mason's and Stucco (ASTM C207 Type S)

Air Entraining Mason's and Stucco Lime (ASTM C207 Type S)

U Portland Cement-Lime Stucco

Mixed in accordance with ASTM C926. Proportions: scratch coat—1 bag cement: $\frac{3}{4}$ to 1 bag BONDCRETE Lime: 5 to 6 cu.ft. sand; finish coat—1 bag cement: 2 bags lime: 7 to 10 cu.ft. sand.

V Masonry Materials

Masonry Units—Brick, face (ASTM C216) or common (ASTM C62), having a min. compressive strength of 2,000 psi tested per ASTM C67. Other units specified by the architect meeting ASTM C126, C652 or approved by authorities having jurisdiction may be used.

Mortar—Portland cement-lime mortar (Type S, 1: $\frac{1}{2}$:4 $\frac{1}{2}$ mix) or (Type N, 1:1:6 mix)(ASTM C270)(Masonry cement mortars shall not be used) Brick ties (18-ga. corrugated G-90 galvanized coating) (adjustable wire type) or as specified. Refer to Section 4.1.6.

W Runner Fasteners

$\frac{5}{8}$ " dia. power-driven type with penetration into 3,000 psi concrete, lengths as required; 1 $\frac{1}{8}$ " Type S-12 Pilot Point for attaching

$\frac{3}{4}$ " plywood to 18-ga. C-closure.

X No. 15 Asphalt or TYVEK Housewrap Sheet

Y Sealants

Architectural and/or vapor sealants specified by architect.

Part 3: Interior Steel Framed Wall and Ceiling Erection

3.1 Partition Installation

3.1.1 Stud System Erection

Attach steel runners at floor and ceiling to structural elements with suitable fasteners located 2" from each end and spaced 24" o.c. To suspended ceilings, use toggle bolts or hollow wall anchors spaced 16" o.c.

Position studs vertically, with open side facing in same direction, engaging floor and ceiling runners, and spaced 24" o.c. When necessary, splice studs with 8" nested lap and two positive attachments per stud flange. Place studs in direct contact with all door frame jambs, abutting partitions, partition corners and existing

construction elements. Where studs are installed directly against exterior walls and a possibility of water penetration through walls exists, install asphalt felt strips between studs and wall surfaces.

Anchor all studs for shelf-walls and those adjacent to door and window frames, partition intersections, corners and free-standing furring to ceiling and floor runner flanges with metal lock fastener tool or screws; see details for general perimeter relief. Securely anchor studs to jamb and head anchors of door or borrowed-light frames by bolt or screw attachment. Over metal door and borrowed-light frames, place horizontally a cut-to-length section of runner, with a web-flange bend at each end, and secure to strut-studs with two screws in each bent web. Position a cut-to-length stud (extending to ceiling runner) at vertical panel joints over door frame header. When attaching studs to steel grid system, structural adequacy of grid to support end reaction of wall must be determined.

3.1.2 Resilient Channel Erection

Position RC-1 Resilient Channel at right angles to steel studs, space 24" o.c. and attach to stud flanges with pan head framing screws driven through holes in channel mounting flange. Install channels with mounting flange down. (Channel may be inverted at floor to accommodate attachment of base.) Locate channels 2" from floor and within 6" of ceiling. Extend channels into all corners and attach to corner framing. Cantilever channel ends no more than 6". Splice channel by nesting directly over stud; screw-attach through both flanges. Reinforce with screws located at both ends of splice.

3.1.3 Sound Attenuation Fire Blanket Installation

Install THERMAFIBER Sound Attenuation Fire Blankets after gypsum panels are applied to the resilient channel and before panels are applied to other side of studs. Insert the 25" wide blanket in the stud cavity, by bowing the blanket slightly. After inserting, make a vertical cut between the studs. Slit the blanket with a sharp utility or hook-bill knife to ease the pressure of the blanket against the gypsum panels when they are installed. Butt ends of blankets closely together and fill all voids.

3.1.4 Gypsum Panel Erection

Apply gypsum panels (parallel to studs) (perpendicular to studs). Position all edges over studs for parallel application; all ends over studs for perpendicular application. Use maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together. Stagger joints on opposite sides of partition.

Screw spacing that follows is for non-rated construction. For fire-rated construction, obtain screw spacing from fire test report or table on page 6.

For single-layer parallel application of gypsum panels, space screws 16" o.c. in field of panels and along vertical abutting edges. For perpendicular panel application, space screws 16" o.c. in field and along abutting end joints.

For single-layer adhesive application, pre-bow panels and attach vertically to studs using $\frac{3}{8}$ " continuous adhesive beads applied to face of studs. Apply one bead to intermediate studs and two beads to studs occurring at panel joints. Secure panel at top and bottom with 1" Type S screws spaced 16" o.c. Impact panel along each stud to insure good contact at all points.

For double-layer screw attachment, space screws 24" o.c. in base layer and 16" o.c. in face layer. Apply both layers of gypsum panels vertically with joints in face layer offset from base layer joints by at least one stud. On tall walls, offset end joints also. For $\frac{1}{2}$ " and $\frac{5}{8}$ " panels, use 1" screws for base layer and 1 $\frac{1}{8}$ " screws for face layer.

For double-layer laminated construction, attach base layer with 1" screws spaced 8" o.c. at joint edges and 12" o.c. in field. Apply

face layer vertically with specified SHEETROCK Setting-Type (DURABOND) Joint Compound or SHEETROCK Ready-Mixed Joint Compound spread on back side, joints staggered approx. 12" and fastened to base layer with 1½" laminating screws. Drive screws approx. 2' from ends and 4' o.c. in field of panel, 1' from ends and 3' o.c. along a line 2" from vertical edges. Temporary shoring or support installed 16" to 24" o.c. until adhesive is dry may be used in place of screws.

For double-layer laminated non-rated construction, attach base layer with 1" Type S screws spaced 16" o.c. at joint edges and in the field of panel. Apply laminating adhesive in strips to center and along both edges of gypsum face panel. Apply strips with a notched metal spreader having four ¼"x ¼" min. notches spaced max. 2" o.c. Position wall panels vertically, press into place with firm pressure to insure bond and fasten top and bottom as required. For ceiling panels, space fasteners 16" o.c. along edges and ends; install one permanent field fastener per framing member at mid-width of panel.

For resilient construction, apply gypsum panels with long dimension perpendicular to resilient channels and fasten with 1" Type S screws spaced 12" o.c. along channels. Where channel resiliency makes screw placement difficult, the next longer screw may be used but do not drive screw directly over stud.

3.1.5 SHEETROCK brand Gypsum Panels, ULTRACODE Core, Erection

A Fire Rated 2 Hour Assembly: Steel Stud Partition,

UL Design U491—Install steel stud framing system as described in Section 3.1.1 using minimum 3½" studs and friction fit 3" THERMAFIBER SAFB as described in Section 3.1.3. Apply ¾" SHEETROCK brand Gypsum Panels, ULTRACODE Core, vertically with wrapped edges parallel to and fully supported by steel framing. Attach panels to studs using 1¼" long (Type S) (Type S-12) drywall screws spaced 8" o.c. along panel edges and ends and 12" o.c. along intermediate framing. Stagger board joints 24" on opposite sides of the partition.

B Fire Rated 2 Hour Assembly: USG C-H Stud Cavity Wall,

UL Design U492—Install framing system and SHEETROCK brand Gypsum Liner Panels as described in Section 3.1.2 using minimum 400CH25 studs and related accessories. Friction fit min. 3" THERMAFIBER SAFB in stud cavity as described in Section 3.1.3. Apply ¾" thick SHEETROCK brand Gypsum Panels, ULTRACODE Core, vertically with wrapped edges parallel to and fully supported by steel framing. Attach panels using 1¼" long (Type S) (Type S-12) drywall screws spaced 8" o.c. along panel edges and ends and 12" o.c. along intermediate framing.

C Fire Rated 3 Hour Assembly: Steel Stud Partition,

UL Design U435—Install steel stud framing system as described in Section 3.1.1 using minimum 158ST25 studs. Apply base layer of ¾" SHEETROCK brand Gypsum Panels, ULTRACODE Core, vertically with wrapped edges parallel to and fully supported by steel framing. Attach panels to studs using 1¼" long (Type S) (Type S-12) drywall screws spaced 24" o.c. along all framing. Stagger board joints 24" on opposite sides of the partition. Apply face layer of ¾" thick SHEETROCK brand Gypsum Panels, ULTRACODE Core, horizontally with wrapped edges perpendicular to steel framing. Stagger panel end joints 24" from base layer panel joints. Attach panels to steel framing using 2¼" long (Type S) (Type S-12) screws 12" o.c. along all framing. Offset face layer screws from base layer screws by 1". Secure face panel to base panel along the horizontal joints of the face layer with 1½" long Type G screws located midway between steel framing (24" o.c.) and 1" from horizontal joint. Stagger face panel joints by 24" on opposite side of the partition. Alternatively, face panels may be installed vertically with wrapped edges parallel to and fully

supported by framing. Attach face panels to steel framing using 2¼" (Type S) Type S-12 screws spaced 12" o.c. Stagger joints in face and base layer by 24" o.c.

D Fire Rated 3 Hour Assembly: Steel Stud Chase Wall,

UL Design U436—Align two parallel rows of floor and ceiling runners spaced 2" apart. Attach to concrete slabs with concrete stub nails or power-driven anchors 24" o.c., to suspended ceilings with toggle bolts 16" o.c., or to wood framing with suitable fasteners 24" o.c.

Position steel studs vertically in runners, 24" o.c. with flanges in the same direction, and with studs on opposite sides of chase directly across from each other.

Cut cross bracing made from gypsum panels, 12" high by chase wall width. Place between rows of studs. Space braces 48" o.c. vertically and attach to stud webs with six 1" Type S screws per brace. If larger braces are used, space screws 8" o.c. max. on each side.

Bracing of 2½" steel studs may be used in place of gypsum panels. Anchor web at each end of steel brace to stud web with two ¾" pan head screws. When chase wall studs are not opposite, install steel stud cross braces 24" o.c. horizontally and securely anchor each end to a continuous horizontal 2½" runner screw-attached to chase wall studs within the cavity.

Apply base layer of ¾" SHEETROCK brand Gypsum Panels, ULTRACODE Core, vertically with wrapped edges parallel to and fully supported by steel framing. Attach panels to studs using 1¼" long (Type S) (Type S-12) drywall screws spaced 24" o.c. along all framing. Stagger board joints 24" on opposite sides of the partition. Apply face layer of ¾" thick SHEETROCK brand Gypsum Panels, ULTRACODE Core, horizontally with wrapped edges perpendicular to steel framing. Stagger panel end joints 24" from base layer panel joints. Attach panels to steel framing using 2¼" long (Type S) (Type S-12) screws 12" o.c. along all framing. Offset face layer screws from base layer screws by 1". Secure face panel to base panel along the horizontal joints of the face layer with 1½" long Type G screws located midway between steel framing (24" o.c.) and 1" from horizontal joint. Stagger face panel joints by 24" on opposite side of the partition. Alternatively, face panels may be installed vertically with wrapped edges parallel to and fully supported by framing. Attach face panels to steel framing using 2¼" (Type S) Type S-12 screws spaced 12" o.c. Stagger joints in face and base layer by 24" o.c.

E Fire Rated 4 Hour Assembly: Steel Stud Partition,

UL Design U490—Install steel stud framing system as described in Section 3.1.1 using minimum 212ST25 studs and friction fit 2" THERMAFIBER SAFB as described in Section 3.1.3. Apply base layer of ¾" SHEETROCK brand Gypsum Panels, ULTRACODE Core, vertically with wrapped edges parallel to and fully supported by steel framing. Attach panels to studs using 1¼" long (Type S) (Type S-12) drywall screws spaced 24" o.c. along all framing. Stagger board joints 24" on opposite sides of the partition. Apply face layer of ¾" thick SHEETROCK brand Gypsum Panels, ULTRACODE Core, horizontally with wrapped edges perpendicular to steel framing. Stagger panel end joints 24" from base layer panel joints. Attach panels to steel framing using 2¼" long (Type S) (Type S-12) screws 12" o.c. along all framing. Offset face layer screws from base layer screws by 1". Secure face panel to base panel along the horizontal joints of the face layer with 1½" long Type G screws located midway between steel framing (24" o.c.) and 1" from horizontal joint. Stagger face panel joints by 24" on opposite side of the partition. Alternatively, face panels may be installed vertically with wrapped edges parallel to and fully supported by framing. Attach face panels to steel framing using 2¼" (Type S) Type S-12 screws spaced 12" o.c. Stagger joints in face and base layer by 24" o.c.

3.1.6 SHEETROCK brand Gypsum Panels, Water-Resistant, Erection

A Framing—If necessary, fur out studs so inside face of shower receptor is flush with gypsum panel face. Install appropriate blocking or headers to support tub and other plumbing fixtures, and to receive soap dishes, grab bars, towel racks and other hardware. When studs are more than 16" o.c., or when ceramic tile over $\frac{5}{16}$ " thick will be used, install suitable blocking between studs. Place blocking approximately 1" above top of tub or receptor and at midpoint between base and ceiling.

B Gypsum Panels—After tub, shower pan or receptor is installed, place temporary $\frac{1}{4}$ " spacer strips around lip of fixture. Pre-cut panels to required sizes and make necessary cut-outs. Before installing panels, brush thinned tile adhesive over all cut or exposed panel edges at utility holes, joints and intersections.

Install panels perpendicular with paperbound edge abutting top of spacer strip. Fasten panels with screws 12" o.c. max. Where ceramic tile more than $\frac{5}{16}$ " thick will be used, space screws 8" o.c. max.

In areas to be tiled, treat all fastener heads with SHEETROCK Setting-Type (DURABOND 45 or 90) or Lightweight Setting-Type (EASY SAND 45 or 90) Joint Compound. Fill tapered edges in gypsum panel with this SHEETROCK Setting-Type Compound, embed SHEETROCK Joint Tape firmly and wipe off excess compound. Follow immediately with a second coat over the taping coat, being careful not to crown the joint. Fold and embed tape properly in all interior angles to provide a true angle.

In areas not to be tiled, embed tape and treat fasteners with SHEETROCK Setting-Type (DURABOND 45 or 90) or Lightweight Setting-Type (EASY SAND 45 or 90) Joint Compound applied in the conventional manner. Finish with at least two coats of setting-type joint compound applied according to directions.

Prior to tile erection, seal cut panel edges of all openings around pipes, fittings and fixtures with thinned tile adhesive. Remove spacer strips, but do not caulk gap at bottom of panels. *Note*—Using an adhesive approved by the tile manufacturer, install tile down to top edge of shower floor or tub and overlapping lip or return of tub or receptor. Fill all tile joints with an unbroken application of grout. Apply caulking compound between the tile and shower floor or tub.

3.2 Chase Wall Erection

Align two parallel rows of floor and ceiling runners spaced apart as detailed. Attach to concrete slabs with concrete stud nails or power-driven anchors 24" o.c., to suspended ceilings with toggle bolts 16" o.c., or to wood framing with suitable fasteners 24" o.c.

Position steel studs vertically in runners, 24" o.c. with flanges in the same direction, and with studs on opposite sides of chase directly across from each other. Except in fire-rated walls, anchor studs to floor and ceiling runner flanges with metal lock fastener tool or screws per paragraph 3.1.1.

Cut cross bracing made from gypsum panels, 12" high by chase wall width. Place between rows of studs. Space braces 48" o.c. vertically and attach to stud webs with six 1" Type S screws per brace. If larger braces are used, space screws 8" o.c. max. on each side.

Bracing of 2 $\frac{1}{2}$ " steel studs may be used in place of gypsum panels. Anchor web at each end of steel brace to stud web with two $\frac{3}{8}$ " pan head screws. When chase wall studs are not opposite, install steel stud cross braces 24" o.c. horizontally and securely anchor each end to a continuous horizontal 2 $\frac{1}{2}$ " runner screw-attached to chase wall studs within the cavity.

3.3 Curved Partition Installation**3.3.1 Framing Erection**

Cut top and bottom runner through leg and web at 2" intervals for arc length. Allow 12" uncut straight runner at each end of arc. Bend runners to uniform curve of specified radius. Clinch a 1"x25-ga. steel strip to inside of cut leg using metal lock fastener. Attach steel runners at floor and ceiling to structural elements with suitable fasteners located 2" from each end and spaced 24" o.c. To suspended ceilings, use toggle bolts or hollow wall anchors spaced 16" o.c.

Position studs vertically, with open side facing in same direction and engaging floor and ceiling runners. Begin and end each arc with a stud and space intermediate studs equally along outside of arc. Secure studs to runners with $\frac{3}{8}$ " pan head framing screws. On tangents, place studs 6" o.c. leaving last stud freestanding. Install balance of stud system in normal manner according to specifications.

3.3.2 Gypsum Panel Preparation

Select length and cut panel so one unbroken panel covers curved surface and 12" tangents at each end. Outside panel must be longer than inside panel to compensate for additional radius contributed by studs.

When wet panels are required, evenly spray water per manufacturer's directions on the surface to be compressed when panels are hung. Carefully stack panels with wet surfaces facing each other and cover stack with a polyethylene sheet. Allow panels to set at least one hour before application.

3.3.3 Gypsum Panel Erection

Apply gypsum panels horizontally with the wrapped edges perpendicular to studs. On the convex side of the partition, begin installation at one end of the curved surface and fasten panel to studs as it is wrapped around the curve. On the concave side, start fastening panel to the stud at the center of the curve and work outward to the panel ends. Fasten single-layer panels with 1" Type S screws spaced 12" o.c.

For double-layer application, apply base layer horizontally and fasten to stud with 1" Type S screws spaced 16" o.c. Center face layer panels over joints in the base layer and secure to studs with 1 $\frac{1}{2}$ " Type S screws spaced 12" o.c. Allow panels to dry completely before applying joint treatment.

3.4 USG High-Performance Sound Control Systems

Attach steel runners at floor and ceiling to structural elements with suitable fasteners located 2" from each end and spaced max. 24" o.c. Position studs vertically, engaging floor and ceiling runners, and spaced 24" o.c. Place studs with open side facing in same direction. Position resilient channels horizontally with mounting flange down and attach to narrow stud flange with $\frac{3}{8}$ " Type S-12 pan head screws. Locate channels 1 $\frac{1}{2}$ " from floor, within 6" of ceiling and max. 24" o.c.

Friction fit sound attenuation fire blankets between studs with min. $\frac{3}{8}$ " space between blankets and resilient channels. Butt blanket ends tightly and fill all voids.

Cut gypsum panels $\frac{1}{2}$ " shorter than floor-to-ceiling height and apply vertically with $\frac{1}{4}$ " gap at floor, ceiling and abutting intersections. Use $\frac{1}{4}$ " thick shims at the floor to support the panels on the resilient channel side until all screws are installed. Remove shims so gypsum panels are supported by the resilient channels. Channels will deflect when properly loaded. Position panel edges over studs on the direct applied side. Stagger joints in adjacent layers.

For direct-application side, apply first layer to studs with (1") (1 $\frac{1}{4}$ ") SUPER-TITE DRILLERS Screws (12") (24") o.c., apply second layer with 1 $\frac{1}{2}$ " SUPER-TITE DRILLERS Screws (12") (24") o.c. and

- B** Apply metal lath with long dimensions across supports, with ends lapped 1" and staggered in adjacent courses, sides lapped ½" and with lath over control joint flanges. Screw-attach self-furring metal lath through sheathing and felt to steel studs spaced 24" o.c. max. and runners with 1½" modified truss or pancake head corrosion-resistant screws 8" o.c. Screw-attach lath through control joint flanges and sheathing into studs.

- C** Apply other lathing accessories per Folder SA-920.

4.1.4 Exterior Stucco

Apply scratch coat and brown coats to nominal 1" thickness. Apply scratch coat with sufficient material and pressure to form good full keys on metal lath, then cross rake. After scratch coat has set firm and hard, apply brown coat to full grounds and straighten to a true surface. Leave rough for finish coat or matrix application or seed aggregate before brown coat has set.

4.1.5 C-H Studs and Runners

- A** Position J-Runners at floor and ceiling with short leg toward inside of wall and secure with power-driven fasteners spaced () o.c.
- B** Cut infill panels 1" less than floor-to-ceiling height. Drive two 8d duplex nails into bottom of gypsum liner panel, 4" from each edge, to support panel above runner. Install first gypsum liner panel, position C-H Stud on free end of panel, then continue alternate gypsum liner panel and stud applications to complete wall.

4.1.6 Masonry Materials

- A** Select masonry mortar, cavity width, mortar joint tooling requirements and erect per current applicable BIA technical notes in a workmanlike fashion per architect's specifications and details.
- B** Anchor brick with approved brick ties, screw-attached to each steel stud using two 1½" pancake head corrosion-resistant screws. Anchor other masonry units to each stud in a similar manner, 16" o.c. max. or as recommended by the Brick Institute of America. If corrugated brick ties are selected, anchor within ½" of bend.
- C** Support bricks with steel angles or concrete ledge at each floor or as approved by architect.

4.1.7 Other Dry Exterior Facings

Follow manufacturer's recommendations for application.

4.1.8 Insulation

- A** Apply 2' wide extruded polystyrene insulation horizontally with tongue edge up, or 4' wide insulation vertically over gypsum sheathing covered with felt. Fasten panels to studs with Type S-12 wafer head insulation screws spaced max. 12" o.c. Use 2" length for 1" thick insulation, 2½" length for 1½" insulation, 3" length for 2" insulation. At wall perimeter and terminations, install screws 8" o.c. Cover framing with panels and fit joints tightly. For fire-rated construction, apply 2' wide extruded polystyrene insulation horizontally with tongue edge up over gypsum sheathing. Fasten 1" panels to studs with 2" Type S-12 wafer head insulation screws spaced 12" o.c. Cover sheathing with panels and fit joints tightly.
- B** Insert THERMAFIBER Fire-Safety FS-15 Blankets between studs and staple to the gypsum sheathing using ⅝" staples with divergent points placed at each corner and in center of each blanket, or friction-fit THERMAFIBER CW-40 Insulation between steel studs. Install THERMAFIBER Safing Insulation of proper size on (impaling clips) (support brackets) spaced as needed, 24" o.c. max., in safe-off area between curtain walls and floor slabs, leaving no voids.

4.1.9 Drywall Interior

- A** Position SHEETROCK brand Gypsum Panels, Foil-Back, FIRECODE Core, vertically or horizontally and attach to studs with 1" screws spaced 8" o.c.
- B** For furred interior construction, apply SHEETROCK brand Gypsum Panels vertically or horizontally and attach to studs with 1" screws 8" o.c. Over the first panel layer, apply metal furring channels horizontally 24" o.c. and screw-attach through panels into steel studs. Attach each channel attachment flange to each stud with 1" screws. Screw-attach a second layer of foil-back panels to furring channels with 1" screws spaced 12" o.c.
- C** Install drywall accessories, finish joints, accessories and screw heads per Folder SA-927.

4.1.10 Veneer Finish Interior

- A** Apply Foil-Back IMPERIAL Gypsum Base vertically or horizontally and attach to stud with 1" screws 8" o.c. Install veneer base interior immediately following gypsum sheathing application to properly resist design wind loads.
- B** Install lathing accessories and apply IMPERIAL Plaster per Folder SA-920.

Product Information and Literature: 1-800-USG-4YOU (1-800-874-4968).

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United States Gypsum Company

125 South Franklin Street

P.O. Box 806278

Chicago, Illinois 60680-4124

A Subsidiary of USG Corporation

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Drywall/Wood Framed Systems



For lightweight, quickly erected, fire-rated walls
and ceilings with excellent sound attenuation

USG

The basic gypsum drywall assemblies described herein offer economical, quickly erected, load-bearing partitions, walls and ceilings wherever fire protection is desired with wood framing. Excellent sound attenuation at low cost is provided when gypsum panels are resiliently attached. The assemblies are likewise suitable for wall furring and exterior soffit applications. Also designed for wood-frame construction are USG Area Separation Fire Walls/Party Walls fire-rated gypsum drywall assemblies for multi-family housing (see separate System Folder SA-925) and TEXTONE Vinyl-Covered Gypsum Panels (see separate Product Folder SA-928). Variations of the systems are outlined below:

Single layer—a basic drywall load-bearing construction suitable where SHEETROCK brand Gypsum Panels are applied direct to wood framing—either vertically with long edges parallel to framing, or horizontally with long edges at right angles to framing members. Perpendicular application, recommended except in certain fire-rated partition construction, provides greater strength, reduces joint treatment and blocking needed, and compensates for uneven framing alignment. Fastening of panels is by four alternate methods:

- 1 **Standard single nailing**—6" to 7" o.c. spacing for ceilings, 7" to 8" for walls.
- 2 **Double nailing**—for minimizing defects due to loosely nailed panels. First nails spaced 12" o.c., followed by second nails in close proximity (2") of first.
- 3 **Screw application**—best known insurance against fastener pops caused by loosely attached panels. 1½" Type W screw is used.
- 4 **Adhesive application**—continuous bead of drywall stud adhesive applied to framing plus supplementary nailing; improves bond strength by 50% to 100%, greatly reduces face nailing needed. When vinyl foam tape is used on sidewalls with stud adhesive, supplementary fasteners are unnecessary.

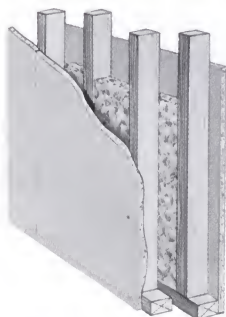
Three proven methods of upgrading single layer job quality:

- 1 **SHEETROCK brand Gypsum Panels, SW Edge**—Panels have an exclusive tapered rounded edge to help minimize ridging or beading and other imperfections and help compensate for extremes of temperature and humidity during construction.
- 2 **Back-Blocking Joint Reinforcement**—a method designed to minimize an inherent joint deformation ("ridging") that may occur with adverse job and weather conditions.
- 3 **Floating Interior Angle System**—application of panels to effectively reduce nail pops and angle cracking which may result from stresses at intersections of walls and ceilings.



Double Layer—systems have a face layer of SHEETROCK brand Gypsum Panels job-laminated to a base layer of gypsum panels and/or nailed or screw-attached through base layer directly to wood framing in walls and ceilings. Because laminated systems minimize the use of mechanical fasteners in the face layer, finer appearance results—along with greater strength, fire and sound resistance. Adhesive lamination of face layer to base layer, when both are gypsum panels, is by either of two methods: (a) strip lamination—SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound or SHEETROCK Taping or All Purpose Joint Compound Ready-Mixed applied in vertical strips 24" o.c. and supplementary 1½" Type G screws, or (b) sheet lamination—adhesive applied over the entire panel surface with supplementary Type G screws or temporary supports until adhesive dries.

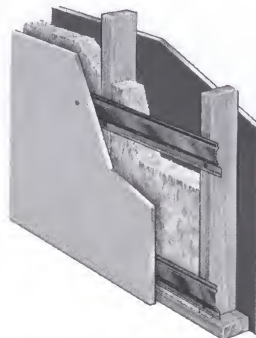
These assemblies are completed with a United States Gypsum Company joint treatment system and decorating. In walls, however, when predecorated TEXTONE Vinyl-Faced Gypsum Panels are adhesively applied, joint treatment is not required (see folder SA-928).



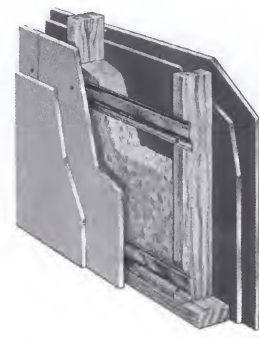
Single-layer staggered stud partition (sys. ref. E)



Double-layer partition (sys. ref. J)



Single-layer resilient partition (sys. ref. B)

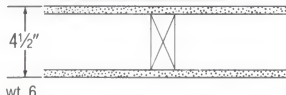
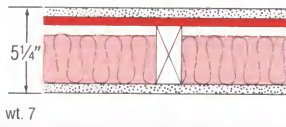
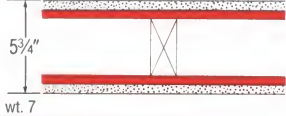
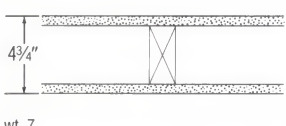
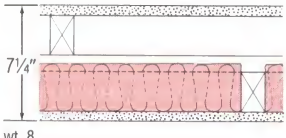
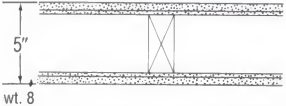
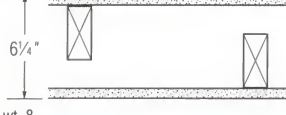
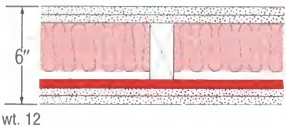
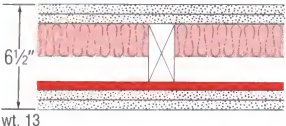
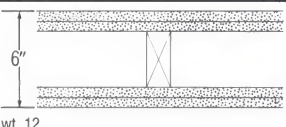
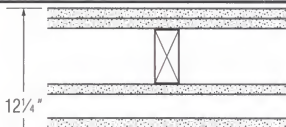



Double-layer resilient partition (sys. ref. H)

Partition Applications



Insulation*

RC-1™ Resilient Channels

Fire rating	Fire-rated construction detail & physical data	Description & test no.	Acoustical performance		System reference
			STC	Description & test no.	
45 min.	 4 1/2" wt. 6	Wd Stud—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—2x4 16" o.c.—panels nailed 7" o.c.—1 1/4" cem ctd nails—joints fin— UL Des U317	N/A		A
1 hr.	 5 1/4" wt. 7	Wd Stud—resil partition—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—2x4 16" or 24" o.c.—3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c.—panels att with 1" Type S screws—opp side direct att with 1 1/4" Type W screws—end joints back-blocked with RC-1 chan—joints fin—perimeter caulked— UL Des U311	50	BBN-760903	B
1 hr.	 5 3/4" wt. 7	Wd Stud—resil partition—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—2x4 16" o.c.—RC-1 chan both sides spaced 24" o.c.—panels att with 1" Type S screws—joints fin—perimeter caulked— T-1396-OSU	41	Based on RC-1 channel one side only— USG-860802	C
1 hr.	 4 3/4" wt. 7	Wd Stud—1/2" SHEETROCK brand gypsum panels, FIRECODE core or SHEETROCK brand gypsum panels, water-resistant, FIRECODE core—2x4 16" or 24" o.c.—panels nailed 7" o.c.—1 1/4" cem ctd nails—joints exp or fin—perim caulked— UL Des U305 based on 16" stud spacing— UL Des U314 based on 24" stud spacing, joints fin	34 37 46	Based on 16" stud spacing and screws 6" o.c.— USG-30-FT-G&H Based on 24" stud spacing— USG-860807 Based on 24" stud spacing & 3" SAFB— BBN-700725	D
1 hr. est	 7 1/4" wt. 8	Stag Wd Stud—1/2" SHEETROCK brand gypsum panels, FIRECODE core—2x3 non-load bearing studs 16" o.c.—2x3 plates 1" apart—panels nailed 7" o.c.—3" THERMAFIBER SAFB one side—joints fin—perim caulked—est. fire rating based on UL Des U305	54	Based on SHEETROCK brand gypsum panels, FIRECODE C core, and on screws or nails 7" o.c.— TL-77-149	E
1 hr. est	 5" wt. 8	Wd Stud—2 layer—base layer 1/2" SHEETROCK brand gypsum panels appl vert with 4d ctd nails—1/2" panel face layer strip lamin—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—2x4 16" o.c.—joints stag & fin—perimeter caulked—est. fire rating based on UL Des U305	45 53	TL-69-52 Based on 3/8" lamin. FIRECODE core face layers & 1 1/2" SAFB— USG-221-ST-G&H	F
1 hr.	 6 1/4" wt. 8	Stag Wd Stud—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—2x4 16" o.c. on 2x6 com plate—panels att with 6d ctd nails or 1 1/4" screws 7" o.c.—perim caulked—joints fin— UL Des U340	N/A		G
2 hr.	 6" wt. 12	Wd Stud—2 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, ea side—2x4 16" o.c.—3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c.—resil side screw att—opp side nail att—both base layers appl vert and face layers appl horiz—base layers perim caulked—end joints back-blocked with RC-1 chan—joints fin— UL Des U334	59 49	TL-67-239 Based on same construction without SAFB— TL-67-212	H
2 hr.	 6 1/2" wt. 13	Wd Stud—2 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, ea side—2x4 16" o.c.—2" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c.—resil side screw att—opp side nail att—both base layers appl vert and face layers appl horiz—resil layers perim caulked—joints fin— T-4799-OSU	58 52	USG-810219 Based on same assembly (non-rated) without SAFB— USG-810218	I
2 hr.	 6" wt. 12	Wd Stud—2 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE core, or SHEETROCK brand gypsum panels, water-resistant, FIRECODE core, ea side—2x4 16" o.c.—base layer att with 1 1/4" nails 6" o.c.—face layer att with 2 3/4" nails 8" o.c.—joints fin— UL Des U301	N/A		J
2 hr.	 12 1/4" wt. 13	Wd Stud—2 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE core, outside, both sides—1/2" SHEETROCK brand gypsum panels, FIRECODE core, inside, both sides—2 rows 2x4 24" o.c.—base layer att with 6d ctd nails 6" o.c.—face layer att with 8d ctd nails 8" o.c.—perim caulked—joints fin— UL Des U342	N/A		K
2 hr. est	 8" wt. 13	Stag Wd Stud—2 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core—2x4 16" o.c. on 2x6 com plate—base layer att with 6d ctd nails 6" o.c.—face layer att with 8d ctd nails 8" o.c.—perim caulked—joints fin—est. fire rating based on UL Des U301	47	TL-69-211	L


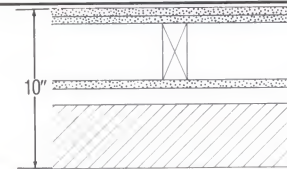

*Where thermal insulation is shown in assembly drawings, the specific product is required in the assembly to achieve the stated fire rating. Fiberglass insulation can not be substituted for THERMAFIBER Insulation.

Wall Furring Applications

Detail & physical data	Description	Comments	
	SHEETROCK Z-Furring Channels 24" o.c.—THERMAFIBER fire safety FS-15 blankets between channels—1/2" SHEETROCK brand gypsum panels, foil-back, screw-attached—joints finished	System suitable for up to 3" thick insulation; good vapor retarder, no limiting height	M
	Wood furring strips 16" o.c.—1/2" SHEETROCK brand gypsum panels, foil-back—joints finished	Surface not isolated from structural stresses	N

For ceiling applications, see page 8.

Exterior Wall Applications

Fire rating	Fire-rated construction Detail & physical data	Description & test no.	Comments	
1 hr.		Wd Stud—3/4" SHEETROCK brand gypsum panels, FIRECODE C core, interior—1" foamed plastic and 1/2" plywd siding—2x4 16" o.c.—3 1/2" THERMAFIBER fire safety FS-15 blankets—foamed plastic att with 1 1/2" galv nails, plwd siding att with 10d galv nails 12" o.c.—gypsum panels appl vert with 6d cem ctd nails 7" o.c.—joints fin—UL Des U330	Rating applicable to fire exposure on interior face only.	0
2 hr.		Wd Stud—2 layers 3/4" SHEETROCK brand gypsum panels, FIRECODE core, interior—1/2" gypsum sheathing and 4" brick masonry veneer exterior—2x4 16" o.c.—sheathing appl horiz with 11d galv nails 6" o.c.—gypsum panels appl horiz or vert with nails 8" o.c.—joints stag & fin—UL Des U302		P
2 hr.		Wd Stud—2 layers 3/4" SHEETROCK brand gypsum panels, FIRECODE core, interior—2 layers 3/4" SHEETROCK brand gypsum sheathing, FIRECODE core, exterior—2x4 16" o.c.—base layer att with 1 1/4" nails 6" o.c.—face layer att with 2 1/4" nails 8" o.c.—joints—exp of fin—UL Des U301		Q

Sound Transmission Loss—db

System reference (p.3)	Test no.	Method	Band center frequency—Hz																STC
			125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	
H	TL-67-239	Lab	35	41	47	53	56	57	59	60	61	63	64	65	65	64	59	61	59
I	USG-810219	Lab	39	42	48	51	53	56	57	57	60	60	60	62	57	58	59	61	58
K	USG-710120	Field	43	40	46	49	48	49	51	54	56	59	60	64	66	66	65	71	56
E	TL-77-149	Lab	31	38	39	45	50	52	55	57	57	57	59	58	57	55	55	57	54
F	USG-221-ST-G&H	Lab	30	37	42	47	48	48	48	51	55	57	58	59	59	57	59	62	53
I	USG-810218	Lab	38	31	38	45	49	53	52	54	56	57	58	59	53	55	58	62	52
K	TL-69-214	Lab	31	35	34	39	44	48	51	53	56	56	59	57	50	53	59	59	51
B	BBN-760903	Lab	26	30	36	42	45	47	50	55	56	57	57	57	55	51	54	58	50
H	TL-67-212	Lab	26	30	33	39	42	47	49	52	55	57	60	61	61	58	53	56	49
L	TL-69-211	Lab	30	33	35	40	40	42	44	46	49	51	52	52	48	48	53	57	47
F	TL-69-52	Lab	21	28	34	35	39	41	41	46	49	51	54	56	55	53	52	55	45
G	TL-69-213	Lab	25	31	35	37	41	40	40	43	46	46	51	51	47	47	51	54	45
D	USG-860807	Lab	25	20	34	37	33	32	37	36	40	42	44	45	38	34	36	41	37

Resilient Attachment—SHEETROCK brand Gypsum Panels are screw-attached to RC-1 Resilient Channels (part of the family of SHEETROCK Metal Products) which are screw-attached 24" o.c. to the framing. The galvanized steel channels "float" the panels away from the framing; provide a spring action that isolates the gypsum panel surface. These systems combine highly effective sound isolation with lightweight low-cost construction.

An excellent value in wood frame party walls consists of single-layer 5/8" SHEETROCK brand Gypsum Panels, FIRECODE C Core, resiliently attached to one side of studs and directly attached to the other side, plus 3" THERMAFIBER SAFB pressed tightly into the stud cavity. This lightweight partition is widely used for its high sound value, STC 50, at costs which are little more than for conventional partition systems. (Use of a filler strip at the base may reduce STC rating.) It also offers 1-hour rated fire resistance; often chosen for use between units in garden apartments.

Where exceptional sound control, greater fire resistance and strength are required, double-layer drywall construction is used with THERMAFIBER SAFB and RC-1 Resilient Channels applied to one side of wood studs (see table above).

Area Separation Fire Wall/Party Wall—fast-erecting non-load bearing drywall partitions for low-cost fire barriers in wood-frame multi-family housing (see separate Systems Folder SA-925).

Wall Furring—SHEETROCK brand Gypsum Panels, Foil-Back, provide an economical, efficient vapor retarder and a readily decorated interior surface for exterior walls. Panels are attached to wood furring strips 16" o.c. or screw-attached to SHEETROCK Z-Furring Channels 24" o.c. The channels mechanically attach THERMAFIBER Fire Safety FS-15 Blankets or rigid foam insulation to the interior of exterior walls. The system provides a self-furring solid backup for SHEETROCK brand Gypsum Panels, Foil-Back, screw-attached to the channels.

Renovation— $\frac{1}{2}$ " SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw-attached to SHEETROCK Z-Furring Channels with THERMAFIBER SAFB between channels, improve the sound control of wood stud plaster walls. With 3" channels and 2" blankets, the assembly provides 50 STC sound rating.

Gypsum panels for these assemblies are available in five thicknesses and nine types. SHEETROCK brand Gypsum Panels, FIRECODE Core, and SHEETROCK brand Gypsum Panels, FIRECODE C Core, obtain higher fire-resistance ratings than regular panels. SHEETROCK brand Gypsum Panels, Water-Resistant, are recommended as a tile base for tub and shower areas. SHEETROCK brand Exterior Gypsum Ceiling Board offers superior weather-and-sag-resistance plus excellent paintability in exterior soffits.

Gypsum panels are easily screw-applied to channel-type corrosion-resistant steel studs. See *SA-923 Drywall/Steel Framed Systems* in this series for details.

Limitations

- 1 SUPER-TITE or BUILDEX Type S Screws must be used for attachment of single-layer panels to RC-1 Resilient Channels.
- 2 Resilient channels must be attached with $1\frac{1}{4}$ " SUPER-TITE or BUILDEX Type W or Type S Screws. Nails must not be used.
- 3 Resilient ceilings should not be installed beneath highly flexible floor joists. Install only to framing meeting "Wood Framing Requirements" shown in *Gypsum Panels Product Folder SA-927*.
- 4 Direct attachment to wood framing with fastener penetration into wood exceeding 1" is not recommended except where required to meet fire rating.
- 5 Maximum resilient channel spacing: ceilings—24" o.c. for joists 16" o.c.; 16" o.c. for joists 24" o.c. Sidewalls—24" o.c. Also see support spacing limitations on right.
- 6 SHEETROCK brand Gypsum Panels should not be exposed to excessive or continuous moisture and extreme temperature. Specially formulated SHEETROCK brand Gypsum Panels, Water-

Resistant, are recommended as a base for wall tile in bathrooms and other high moisture areas, but they are not recommended for areas subject to constant moisture such as gang showers and commercial food processing. DUROCK Cement Board is recommended as a ceramic tile base under these conditions.

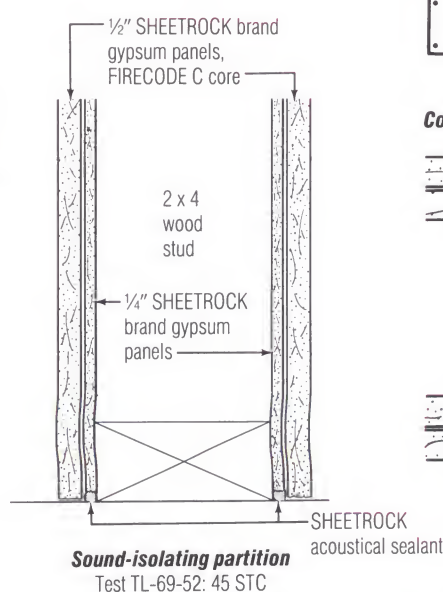
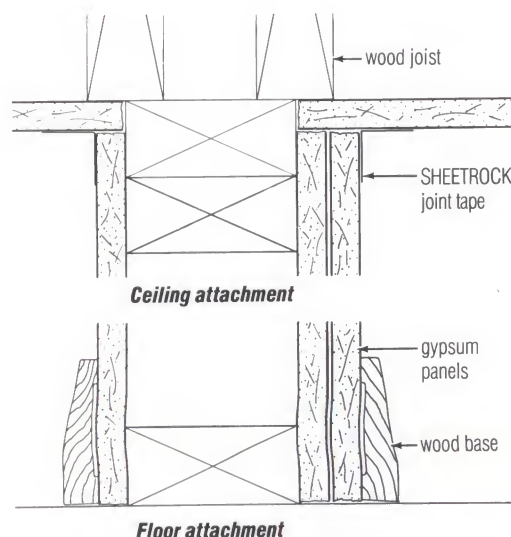
- 7 Maximum support (studs, joists, channels, furring) spacing for gypsum panels:

Panel thickness ⁽¹⁾	Location	Application method ⁽²⁾	Max. support spacing o.c.	
Single-Layer Application			in	mm
⅜" (9.5 mm)	ceilings ⁽³⁾	perpendicular ⁽⁴⁾	16	406
	sidewalls	parallel or perpendicular	16	406
½" (12.7 mm)	ceilings	parallel ⁽⁴⁾	16	406
		perpendicular	24 ⁽⁵⁾⁽⁶⁾	610
	sidewalls	parallel or perpendicular	24	610
⅝" (15.9 mm)	ceilings ⁽⁶⁾	parallel ⁽⁴⁾	16	406
		perpendicular	24	610
	sidewalls	parallel or perpendicular	24	610
Double-Layer Application				
⅜" (9.5 mm)	ceilings ⁽⁷⁾	perpendicular	16	406
	sidewalls	perpendicular or parallel	24 ⁽⁸⁾	610
½" & ⅝" (12.7 & 15.9 mm)	ceilings	perpendicular	24 ⁽⁸⁾	610
	sidewalls	perpendicular or parallel	24 ⁽⁸⁾	610

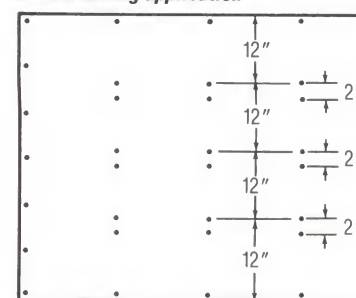
(1) A $\frac{3}{8}$ " thickness is recommended for the finest single-layer construction, providing increased resistance to fire and transmission of sound; $\frac{1}{2}$ " for single-layer application in new residential construction and remodeling; and $\frac{5}{8}$ " for repair and remodeling over existing surfaces. (2) Long edge position relative to framing. (3) Not recommended below unheated spaces. (4) Not recommended if water-based texturing material is to be applied. (5) Max. spacing 16" if water-based texturing material to be applied. (6) If $\frac{1}{2}$ " SHEETROCK brand Interior Gypsum Ceiling Board is used, max. spacing is 24" o.c. for perpendicular application with weight of unsupported insulation not exceeding 2.2 psf., when water-based texturing materials are used. (7) Adhesive must be used to laminate $\frac{3}{8}$ " board for double-layer ceilings. (8) Max. spacing 16" o.c. if fire rating required.

- 8 These assemblies are not recommended for exterior soffits and ceilings which project upwards and away from the building proper.

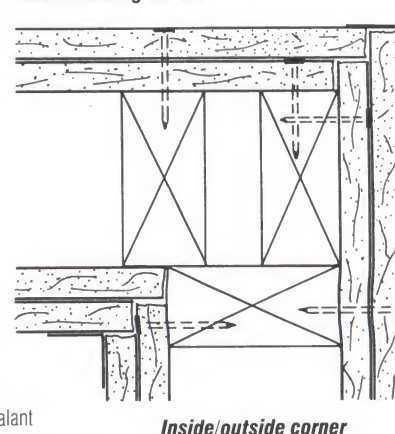
Details/Partitions



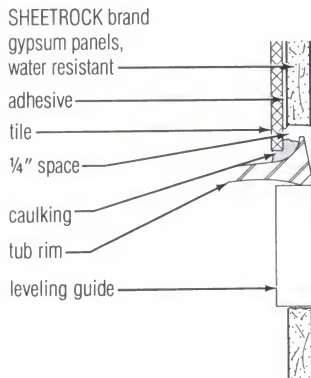
Double nailing application



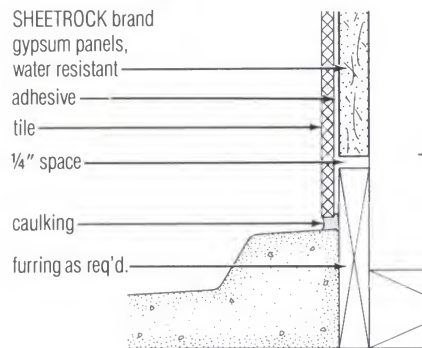
Corner framing details



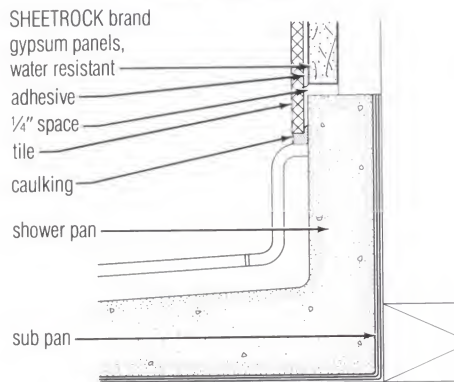
Tub and shower details— SHEETROCK brand gypsum panels, water resistant
single-layer panels



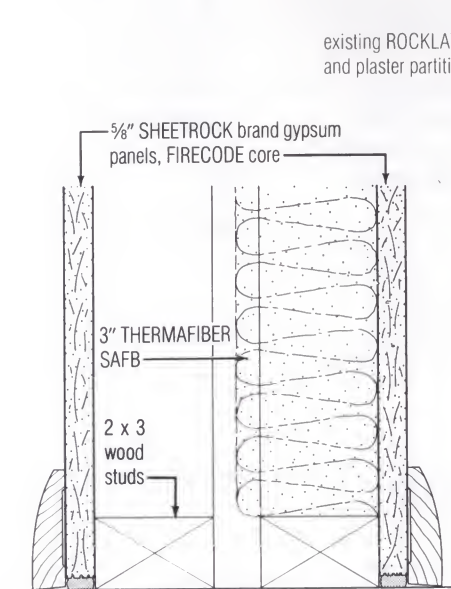
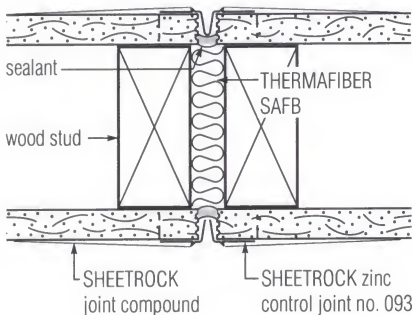
Tub



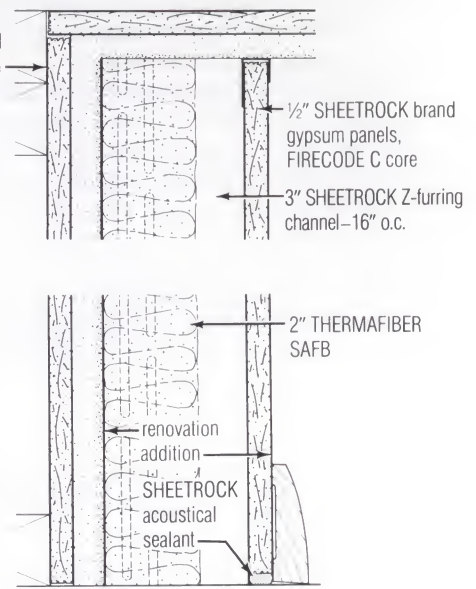
Shower receptor



Wall control joint

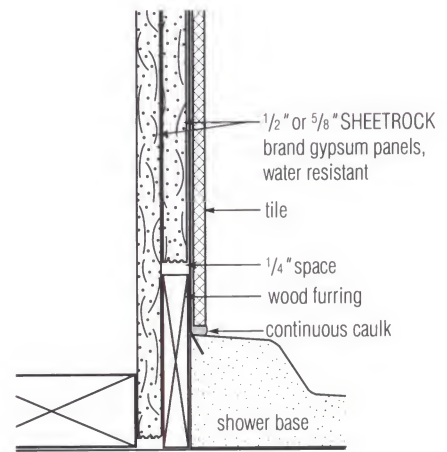
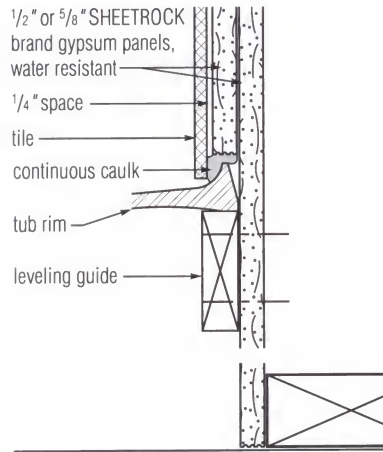


Sound-isolating chase wall partition
Test TL-77-149: 54 STC

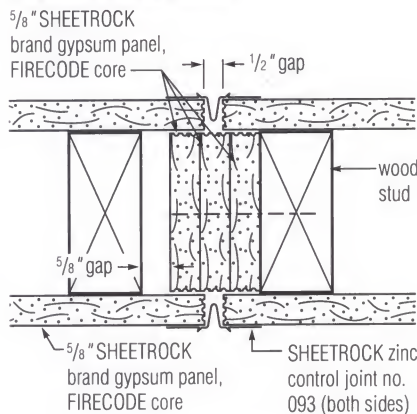


Partition renovation
Test USG-811101:50 STC

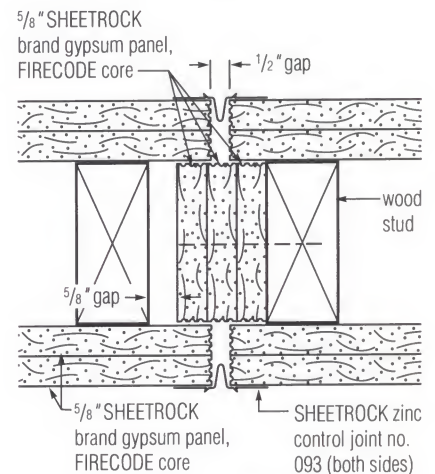
Double-layer panels



Fire-rated control joints

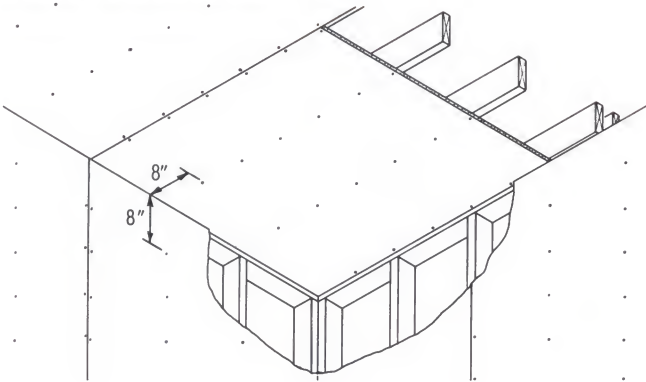


1-Hr. fire resistance—
estimated based on WH-651-0318.1

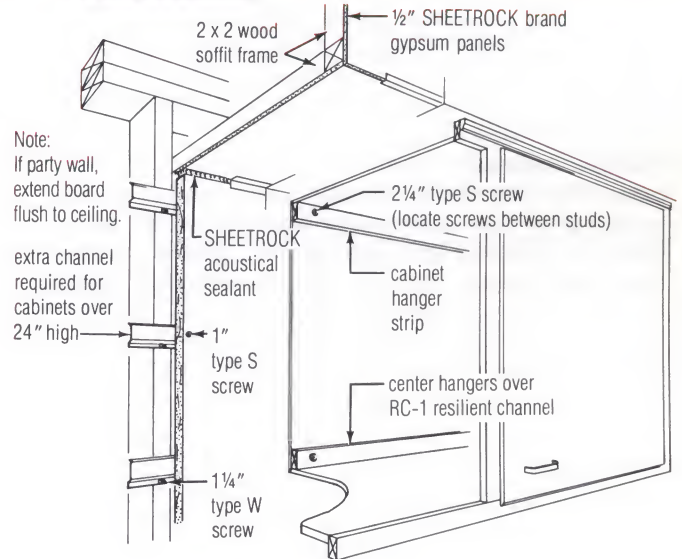


2-Hr. fire resistance—
estimated based on WH-651-0318.1

Floating interior angle system



Cabinet attachment

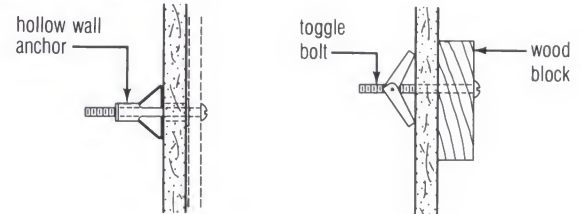


Fastener load data

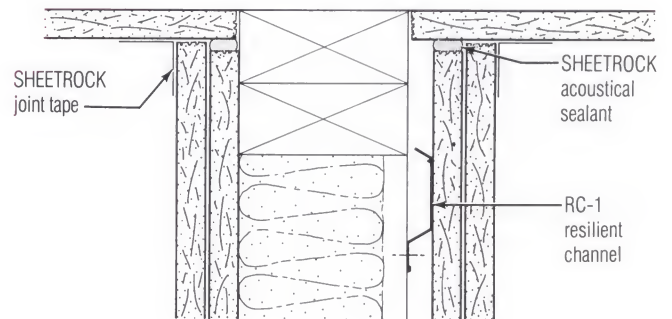
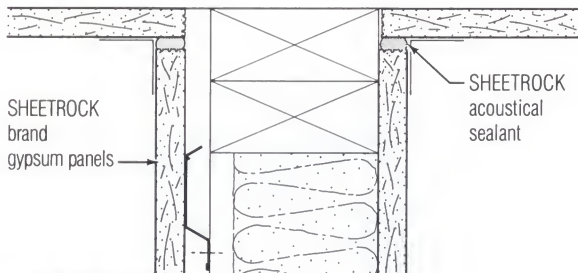
Fastener type	Size		Base assembly	Allow. withdrawal resistance		Allow. shear resistance	
	In	mm		lb	N ⁽¹⁾	lb	N ⁽¹⁾
hollow wall anchor or toggle bolt	3/8	3.18	1/2" gypsum panel	20	89	40	178
	1/2	4.76		30	133	50	222
	5/8	6.35		40	178	60	267

(1) Newtons

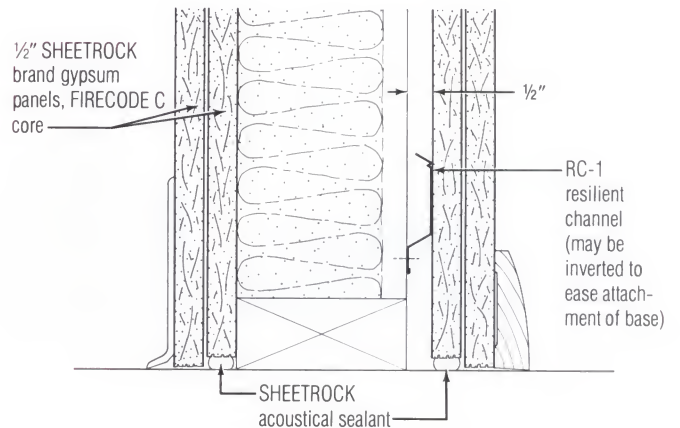
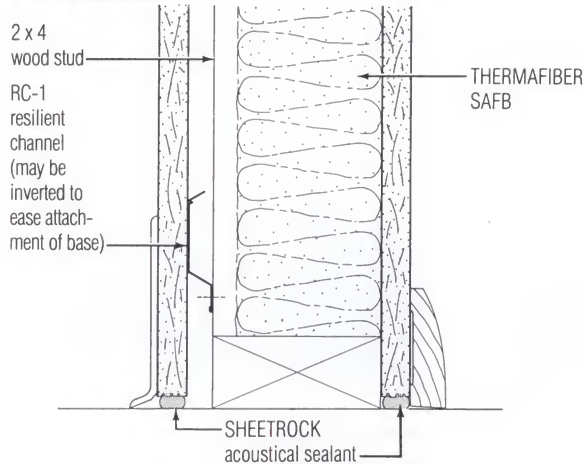
Fixture attachments—light



Ceiling attachments



Floor attachments



Single layer—In single-layer ceiling assemblies, SHEETROCK brand Gypsum Panels are applied across the supports and fastened with nails or screws. Nails are spaced 6" to 7" o.c. (6" for fire-rated construction); 1 1/4" Type W screws are spaced 12" o.c. Where no fire rating is required, adhesive nail-on fastening improves bond strength and reduces face nailing.

Resilient attachment—Resilient channel systems offer fire-resistant wood joist floor/ceiling assemblies having highly efficient sound isolation at low cost—qualities particularly needed in apartments, motels and other multi-family buildings. RC-1 Resilient Channels are screw-attached across wood joists; gypsum panels are attached to channels with Type S screws. A 1-hour fire rating is available with 1/2" SHEETROCK brand Gypsum Panels, FIRECODE C Core.

High performance—USG High Performance Floor/Ceiling Systems achieve a 2-hour fire resistance rating (UL Design L541) and deliver STC/MTC ratings as high as 60/54, IIC ratings as high as 62. Floors consist of 1" SHEETROCK brand Gypsum Liner Panels over 1/2" plywood and are finished in one of two ways: (1) ceramic tile over 1/2" DUROCK Exterior Cement Board, or, (2) vinyl tile or carpet/pad over 1/2" oriented strand board. Ceilings consist of two layers 5/8" SHEETROCK brand Gypsum Panels, FIRECODE C Core, applied over RC-1 Resilient Channels. Installed within the cavity are 3" THERMAFIBER SAFB. See data sheet WB-1868 for complete information.

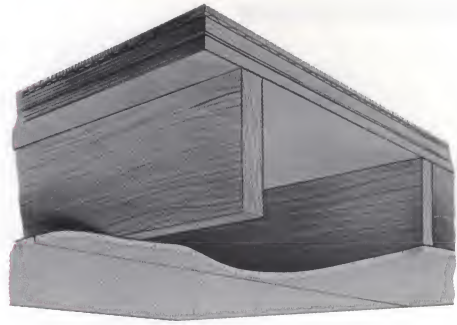
Direct suspension—When additional ceiling space is needed to accommodate large ducts or pipes, gypsum panels are screw-attached below a direct suspension system. This direct-hung steel ceiling grid consists of main beam runners 4' o.c. and cross furring channels spaced 24" o.c. A cross beam supports the edge of lighting fixtures. With 1/2" or 5/8" SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw-attached to this grid, a one-hour fire-rated wood joist floor/ceiling is provided. The assembly includes provision for lighting fixtures, air ducts and dampers.

Textured ceilings—When water-based texturing materials will be applied, 1/2" SHEETROCK brand Interior Gypsum Ceiling Board is ideal because it supports both the sprayed texture and insulation like 5/8" thick panels but at less cost.

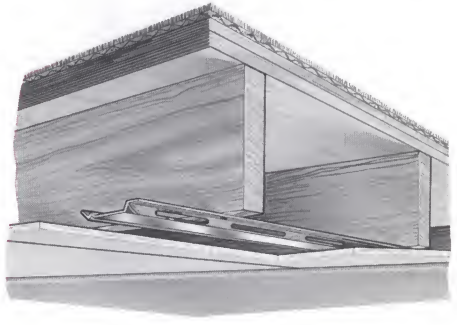
Renovation—To improve the sound control of wood framed floor-ceilings, 1/2" SHEETROCK brand Gypsum Panels, FIRECODE C Core, are screw-attached to 2" SHEETROCK Z-Furring Channels fastened to bottom of joists. With 2" THERMAFIBER SAFB between channels, the system provides 45 STC and 40 IIC ratings (see detail, page 11).

Exterior Soffits—eaves, canopies, carports and other exterior soffits with indirect exposure to the weather are quickly and economically completed with SHEETROCK brand Exterior Gypsum Ceiling Board fastened directly to joists (see United States Gypsum Company Bulletin WB-1152 for detailed specification). Maximum frame spacing and other limitations for these systems are shown on page 5.

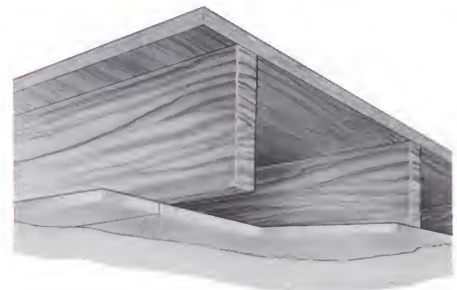
Single-layer ceiling
(sys. ref. A)



Double-layer ceiling
(sys. ref. 0)



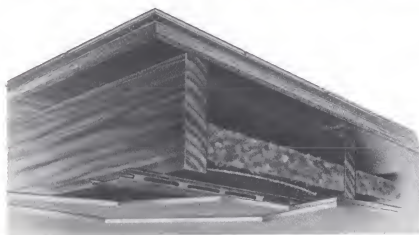
1/2" interior ceiling board with spray texture



Resilient channel with blankets
(sys. ref. G)



USG High Performance Floor/Ceiling Systems (sys. ref. P)



**Ceramic Tile over
DUROCK Exterior Cement Board
Floor/Ceiling Assembly**

STC: 60 MTC: 54 IIC: 52



**Vinyl Tile over
Oriented Strand Board
Floor/Ceiling Assembly**

STC: 58 MTC: 53 IIC: 51



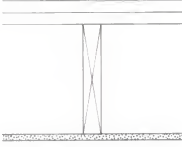
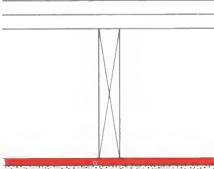
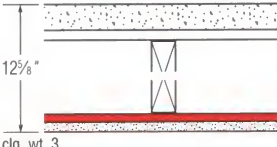
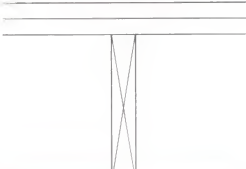
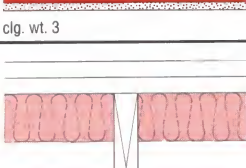
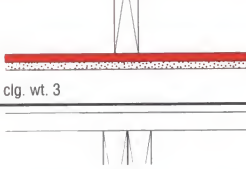
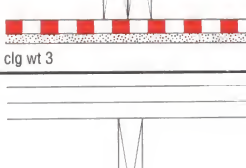
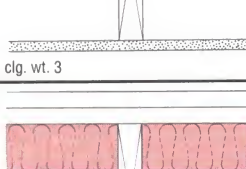
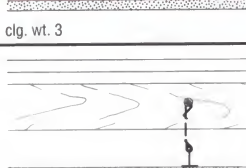
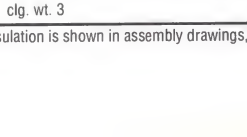
**Carpet/Pad over
Oriented Strand Board
Floor/Ceiling Assembly**

STC: 59 MTC: 54 IIC: 62

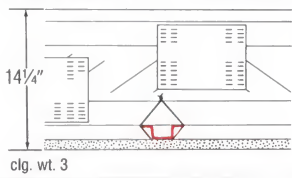
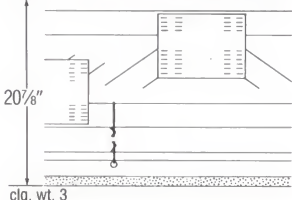
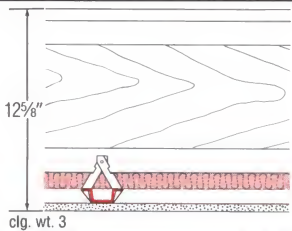
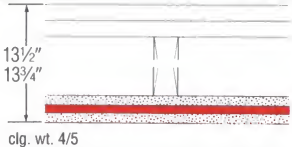
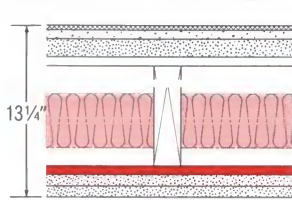
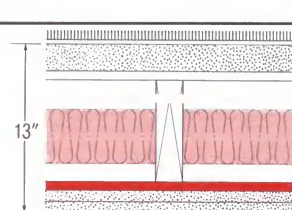
THERMAFIBER Insulation*

RC-1™ Resilient Channels

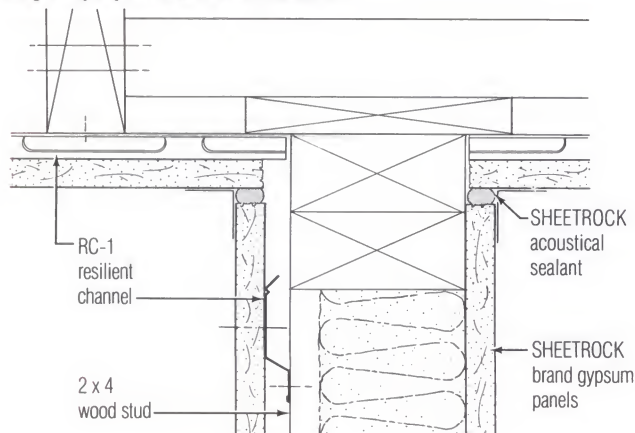
Furring Channels

Fire rating	Fire-rated construction Detail & physical data	Description & test no.	Acoustical performance			System reference
			STC	IIC	Description & test no.	
1 hr.	 clg. wt. 3	1/2" or 5/8" SHEETROCK brand gypsum panels, FIRECODE C core, ceiling—1" nom wd sub & fin flr—2 x 10 wd joist 16" o.c.—panels att with 5d cem ctd nails 6" o.c.—joints fin— UL Des L512	N/A			A
1 hr.	 clg. wt. 3	Resil ceiling—1/2" or 5/8" SHEETROCK brand gypsum panels, FIRECODE C core—1" nom wd sub & fin flr—2 x 10 wd joist 16" o.c.—RC-1 chan spaced 24" o.c.—panels att with 1" Type S screws—end joints back-blocked with RC-1 chan—joints fin— UL Des L514	N/A			B
1 hr.	 clg. wt. 3	Resil ceiling—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—1 1/2" perlite-sand conc over 5/8" plywd sub-floor—2 x 10 wd joist 16" o.c.—RC-1 chan spaced 24" o.c.—panels att with 1" Type S screws—end joints back-blocked with RC-1 chan—joints fin— UL Des L516	59	47	Based on 3" THERMAFIBER SAFB, 3/4" gypsum concrete and 1/2" SHEETROCK brand gypsum panels, FIRECODE C core— USG 740704 Based on 3" THERMAFIBER SAFB, vinyl tile atop flooring— USG 740703 Based on 3" THERMAFIBER SAFB, 44-oz. carpet & 40-oz. pad atop flooring— USG 740705	C
1 hr. est	 clg. wt. 3	Resil ceiling—1/2" or 5/8" SHEETROCK brand gypsum panels, FIRECODE core—1 1/2" nom wd sub & fin flr—2x10 wd joist 16" o.c.—RC-1 chan spaced 24" o.c.—panels att with 1" Type S screws—end joints back-blocked with RC-1 chan—joints fin—est. fire rating based on UL Des L514	47	39	Based on 1/2" SHEETROCK brand gypsum panels, FIRECODE C core— CK-6512-6 Based on 5/8" SHEETROCK brand gypsum panels, FIRECODE core— CK-6412-10	D
1 hr. est	 clg. wt. 3	Resil ceiling—1/2" or 5/8" SHEETROCK brand gypsum panels, FIRECODE core—1 1/2" nom wd sub & fin flr—44-oz carpet & 40-oz pad atop flr—2 x 10 wd joist 16" o.c.—RC-1 chan spaced 24" o.c.—panels att with 1" Type S screws—end joints back-blocked with RC-1 chan—joints fin—est. fire rating based on UL Des L514	47	67	Based on 1/2" SHEETROCK brand gypsum panels, FIRECODE C core— CK-6512-7 Based on 5/8" SHEETROCK brand gypsum panels, FIRECODE core— CK-6412-9	E
1 hr. est	 clg. wt. 3	Resil ceiling—1/2" or 5/8" SHEETROCK brand gypsum panels, FIRECODE core—1 1/2" nom wd sub & fin flr—2x10 wd joist 16" o.c.—3" THERMAFIBER SAFB betw joists—RC-1 chan spaced 24" o.c.—panels att with 1" Type S screws—end joints back-blocked with RC-1 chan—joints fin—est. fire rating based on UL Des L514	51	46	Based on 1/2" SHEETROCK brand gypsum panels, FIRECODE C core— CK-6512-9 Based on 5/8" SHEETROCK brand gypsum panels, FIRECODE core— CK-6412-3	F
1 hr. est	 clg. wt. 3	Resil ceiling—1/2" or 5/8" SHEETROCK brand gypsum panels, FIRECODE core—1 1/2" nom wd sub & fin flr—44-oz carpet & 40-oz pad atop flr—2 x 10 wd joist 16" o.c.—3" THERMAFIBER SAFB betw joists—RC-1 chan spaced 24" o.c.—panels att with 1" Type S screws—end joints back-blocked with RC-1 chan—joints fin—est. fire rating based on UL Des L514	52	71	Based on 1/2" SHEETROCK brand gypsum panels, FIRECODE C core— CK-6512-8 Based on 5/8" SHEETROCK brand gypsum panels, FIRECODE core— CK-6412-4	G
1 hr.	 clg. wt. 3	5/8" SHEETROCK brand gypsum panels, FIRECODE core, ceiling—single 4 x 10 wd joist 48" o.c.—met fur chan spaced 24" o.c.—panels att with 1" Type S screws—joints fin— UL Des L508	N/A			H
1 hr.	 clg. wt. 3	5/8" SHEETROCK brand gypsum panels, FIRECODE core, ceiling—1" nom wd sub & fin flr—2 x 10 wd joist 16" o.c.—panels att with 6d nails 6" o.c.—joints fin— UL Des L501	38	32	Based on 1 1/4" nom wd flr— CK-6412-7 Based on 1 1/4" nom wd flr, 44-oz carpet & 40-oz pad atop flooring— CK-6412-8	I
1 hr. est	 clg. wt. 3	5/8" SHEETROCK brand gypsum panels, FIRECODE core, ceiling—1" nom wd sub & fin flr—2x10 wd joist 16" o.c.—3" THERMAFIBER SAFB betw joists—panels att with 6d nails 6" o.c.—joints fin—est. fire rating based on UL Des L501	41	32	Based on 1 1/4" nom wd flr— CK-6412-6 Based on 1 1/4" nom wd flr, 44-oz carpet & 40-oz pad atop flooring— CK-6412-5	J
1 hr.	 clg. wt. 3	1/2" or 5/8" SHEETROCK brand gypsum panels, FIRECODE C core, ceiling—1" nom wd sub & fin flr—2 x 10 wd joist 16" o.c.—susp grid with main run 4' o.c. and cross tees 2' o.c.—panels screw-att below grid—joints fin— UL Des L525	N/A			K

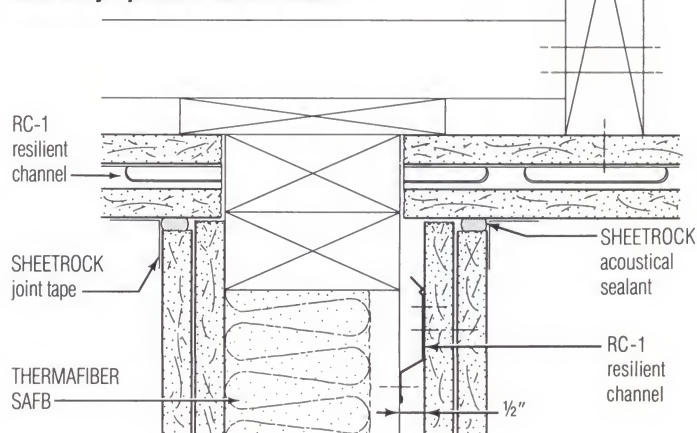
*Where thermal insulation is shown in assembly drawings, the specific product is required in the assembly to achieve the stated fire rating. Fiberglass insulation can not be substituted for THERMAFIBER Insulation.

Fire rating	Fire-rated construction		Acoustical performance			System reference
	Detail & physical data	Description & test no.	STC	IIC	Description & test no.	
1 hr.		1/2" SHEETROCK brand gypsum panels, FIRECODE C core, ceiling—2x12 wd truss of 2x4 lbr secured with steel truss plates—trusses 24" o.c.—3/4" nom plywd flr—met fur chan 24" o.c. wire-tied to trusses—panels att with 1" Type S screws 12" o.c.—joints fin— UL Des L528	N/A			L
1 hr.		1/2" SHEETROCK brand gypsum panels, FIRECODE C core, ceiling—2x12 wd truss of 2x4 lbr secured with steel truss plates—trusses 24" o.c.—3/4" nom plywd flr—susp grid with main run 4" o.c. and cross tees 2" o.c.—panels att with 1" Type S-12 screws 12" o.c.—joints fin— UL Des L529	N/A			M
1 hr.		1/2" SHEETROCK brand gypsum panels, FIRECODE C core, ceiling—3/4" T&G plywd flr—10" I-shaped wd joist 24" o.c.—met fur chan 24" o.c. clip-att to joist—1" THERMAFIBER insul laid over chan below joists—panels screw att to chan 12" o.c.—joints fin— UL Des L530 based on Trus Joist members— UL Des L531 based on Timjoist, Inc. Type TMI members	47	40 54 43	TL-81-87—IN-81-16 Based on carpet & pad atop flooring— IN-81-17 Based on cushioned vinyl atop flooring— IN-81-19	N
1 1/2 hr. 2 hr.		Resil ceiling—2 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core—1" nom wd sub & fin flr—2 x 10 wd joist 16" o.c.—RC-1 chan spaced 24" o.c. screw-att over base layer panels—face layer screw att to chan 12" o.c.—joints fin— UL Des L510 —2 hr. sys. with 1/2" SHEETROCK brand gypsum panels, FIRECODE C core— UL Des L511	N/A		Assembly not recommended when sound control is a major consideration	O
2 hr.		Floor/ceiling—floor of 8"x8" ceramic tile, 1/2" DUROCK exterior cement board, 1" SHEETROCK brand gypsum liner panels, 3/4" plywood—2x10 wd joist 16" o.c.—3" THERMAFIBER SAFB—ceiling of 2 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, over RC-1 chan 16" o.c.— UL Des L541	60 58 59	52 51 62	RAL-TL89-141 (54 MTC)— RAL-IN89-5 Based on vinyl tile over oriented strand board in place of ceramic tile and cement board— RAL-TL89-145 (53 MTC)— RAL-IN89-7 Based on carpet/pad over oriented strand board in place of ceramic tile and cement board— RAL-TL89-146 (54 MTC)— RAL-IN89-8	P
2 hr.		Floor/ceiling—floor of carpet/pad, 1 1/2" Type F flooring, 1/2" plywood—2x10 wd joist 16" o.c.—3" THERMAFIBER SAFB—ceiling of 2 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, over RC-1 chan 16" o.c.— UL Des L541	59 59	69 37	RAL-TL90-40 (54 MTC)— RAL-IN90-5 Based on vinyl tile in place of carpet/pad— RAL-TL90-40 (54 MTC)— RAL-IN90-6	Q

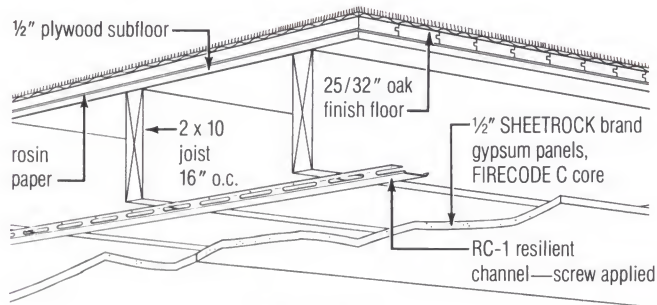
Single-layer panels with RC-1 channel



Double-layer panels with RC-1 channel



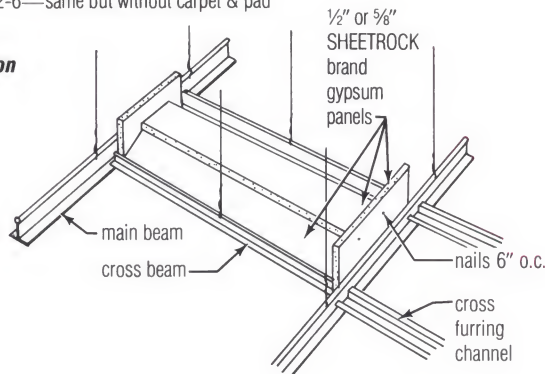
Ceiling and floor assemblies



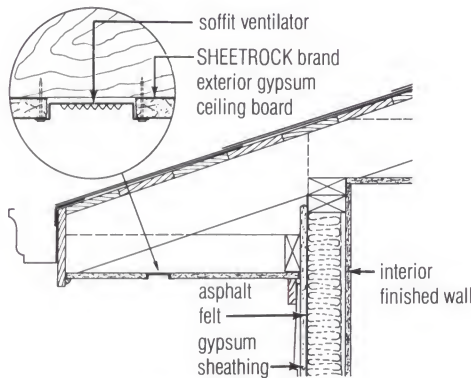
Test CK-6512-7

Test CK-6512-6—same but without carpet & pad

Light fixture fire protection

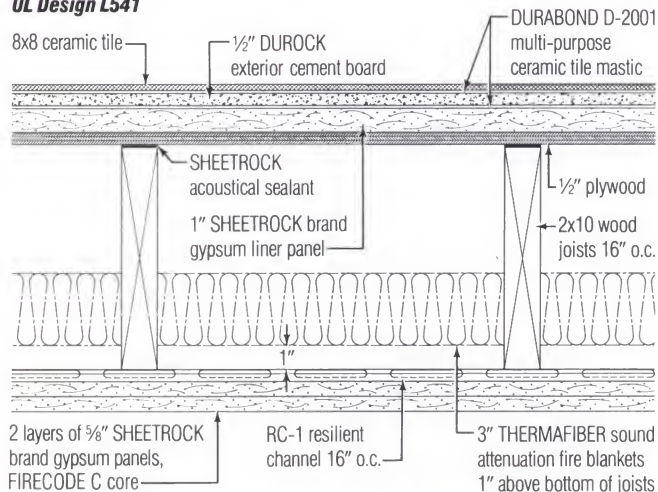


Exterior walls & soffit

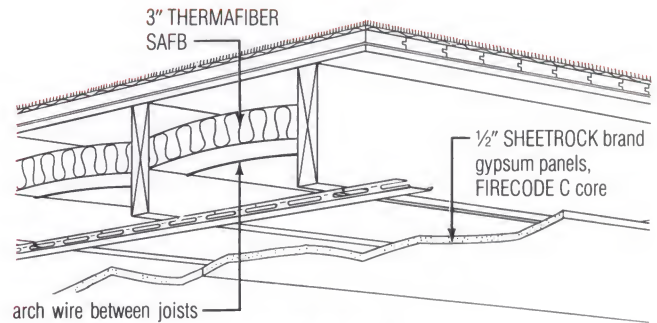


Mineral shingle exterior

UL Design L541

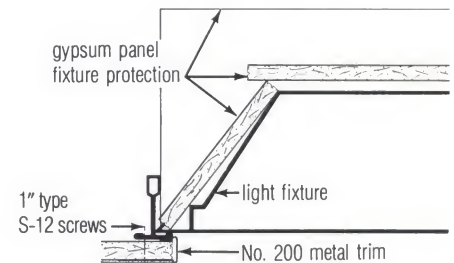


Ceramic tile over DUROCK exterior cement board and SHEETROCK brand gypsum liner panels

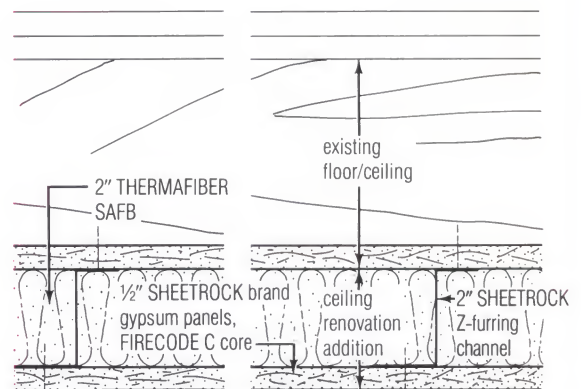


Test CK-6512-8

Test CK-6512-9—same but without carpet & pad

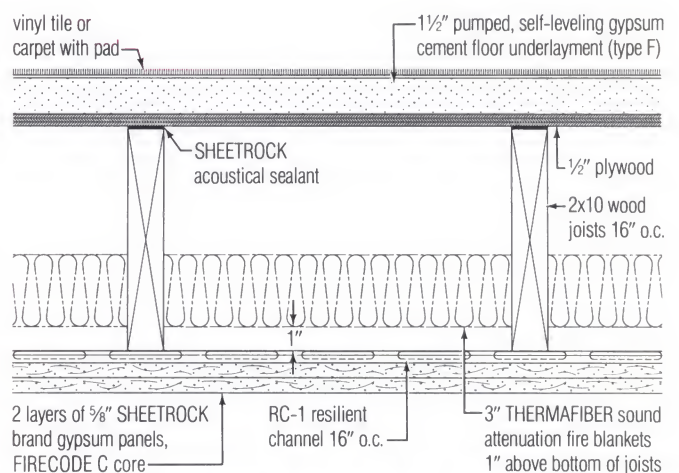


Lighting fixture



Ceiling renovation

Test USG-800107: 45 STC
USG-800108: 40 IIC



Vinyl tile or carpet/pad over type F flooring

1 System Performance—United States Gypsum Company will provide test certification for published fire, sound and structural data covering systems designed and constructed according to its published specifications. Tests are conducted on Company products assembled to meet performance requirements of established test procedures specified by various agencies. System performance following substitution of materials or compromise in assembly design cannot be certified; failure may result under critical conditions.

2 Control Joints—Location of control joints is the responsibility of the design professional/architect. Gypsum panel surfaces should be isolated with control joints or other stress relief where: (a) partition or furring abuts a structural element (except floor) or dissimilar wall or ceiling; (b) ceiling abuts a structural element, dissimilar wall or partition or other vertical penetration; (c) construction changes within the plane of the partition or ceiling; (d) partition or furring run exceeds 30'; (e) ceiling dimensions exceed 50' in either direction with perimeter relief, 30' without relief; (f) exterior soffits exceed 30' in either direction; (g) wings of "L," "U" and "T"-shaped ceiling areas are joined; (h) expansion or control joints occur in the base exterior wall. Ceiling-height door frames may be used as control joints. Less-than-ceiling height frames should have control joints extending to the ceiling from both corners. Treat window openings in same manner as doors.

Gypsum panel surfaces should not be firmly anchored across the flat grain of wide dimensional lumber such as floor joists and headers. Float panels over these members using resilient channels or provide a control joint to counteract wood shrinkage.

3 Penetrations of the gypsum panel diaphragm, such as borrowed lights, access panels, light troffers, require additional reinforcement at corners to distribute concentrated stress if a control joint is not used.

4 Sound tests are conducted under ideal laboratory conditions per ASTM procedures. Comparable field performance depends on building design and careful attention to detailing and workmanship. Where these partitions are used for sound control, seal the partition perimeter with ¼" min. round bead of SHEETROCK Acoustical Sealant. Seal around all cutouts for lights, cabinets, pipes, ducts and electrical boxes. Back-to-back penetrations of the diaphragm, flanking paths, door and borrowed-light openings should be avoided. Exterior wall surfaces should be resiliently mounted to minimize flanking paths between floor and ceiling construction.

5 Air, Water and Vapor Control—Flashing and sealants as shown in the construction documents and as selected by the architect and/or structural engineer should be provided to resist air and water infiltration. The flashing and sealants selected shall be installed in a workmanlike manner in appropriate locations to maintain continuity of air/water barriers, particularly at windows, doors and other penetrations of exterior wall. All gypsum sheathing must be covered with No. 15 asphalt felt or TYVEK Housewrap sheet to ensure watertight construction. Asphalt felt should be applied horizontally with 2" overlap and attached to sheathing. TYVEK sheets should be stapled to sheathing according to manufacturer's directions. Accessories for stucco finishes should be made of zinc alloy with weep holes 12" o.c.

Vapor retarder is normally installed on the warm side of wall in cold climates to prevent interior moisture from entering the stud cavity. Where high humidity and temperature conditions predominate, the use and location of a vapor retarder should be determined by a qualified mechanical engineer to prevent moisture condensation within the wall. Vinyl wall coverings are

not recommended for the interior of walls containing vapor retarders.

6 Ceramic Tile—SHEETROCK brand Gypsum Panels, Water-Resistant, or DUROCK Cement Boards are recommended as a base for adhesive application of ceramic and plastic tile and plastic-faced wall panels. A vapor retarder is not recommended.

Taping and finishing of SHEETROCK brand Gypsum Panels, Water-Resistant, is required under tile. It is recommended that all joints and fastener heads be treated with SHEETROCK Setting-Type (DURABOND 45 or 90) or Lightweight Setting-Type (EASY SAND 45 or 90) Joint Compound. The compound should also be used to embed tape beyond areas to be tiled. These areas should be finished with conventional joint systems.

7 Wood Framing Requirements—Wood framing meeting the minimum requirements of local building codes is necessary for proper performance.

8 Ceiling—To prevent objectionable sag in new gypsum panel ceilings, the weight of overlaid unsupported insulation should not exceed 1.3 psf for ½" thick panels with frame spacing 24" o.c.; 2.2 psf for ½" panels on 16" o.c. framing (or ½" SHEETROCK brand Interior Gypsum Ceiling Board on 24" o.c. framing) and ⅝" panels 24" o.c.; ⅝" thick panels must not be overlaid with unsupported insulation. A vapor retarder should be installed in exterior ceilings, and the plenum or attic space should be properly vented.

During periods of cold or damp weather when a polyethylene vapor retarder is installed on ceilings behind the gypsum board, it is important to install the ceiling insulation before or immediately after installing the ceiling board. Failure to follow this procedure may result in moisture condensation on the back side of the gypsum board, causing the board to sag.

Water-based textures, interior finishing materials and high ambient humidity conditions can produce sag in gypsum ceiling panels if adequate vapor and moisture control is not provided. The following precautions must be observed to minimize sagging of ceiling panels:

- a) Where vapor retarder is required in cold weather conditions, the temperature of the gypsum ceiling panels and vapor retarder must remain above the interior air dew point temperature during and after the installation of panels and finishing materials.
- b) The interior space must be adequately ventilated and air circulation must be provided to remove water vapor from the structure.

Most sag problems are caused by the condensation of water within the gypsum panel. The placement of vapor retarders, insulation levels and ventilation requirements will vary by location and climate and should be reviewed by a qualified engineer if in question.

9 Back-Blocking—Ridging or deformation at the panel joints may occur in gypsum board construction under adverse job or weather conditions. Back blocking end joints will minimize joint ridging and is recommended. Where back-blocking is used, float the end joints between supports and back-block with an 8" wide strip of gypsum board the full length of the joint adhesively applied over abutting ends. For fire-rated resilient construction, back butt-end joints with RC-1 Resilient Channels. Refer to *Gypsum Construction Handbook* for complete details.

10 Fixture Attachment—Lightweight fixtures and trim should be installed using expandable anchors for screw attachment. Medium and heavyweight fixtures are not recommended on resilient surfaces, but if required, they should be supported from the primary framing.

11 Double-Layer Laminated ⅝" Panels—In this assembly, use scaffold nails driven through gypsum blocks into the framing at

third points vertically, or temporary shoring. The 1½" Type G screw is not recommended.

- 12 Acoustical Tile**—Treatment of joints and screwheads with joint compound may be omitted where gypsum panels serve as a base for adhesively applied acoustical tile.
- 13 SHEETROCK brand Exterior Gypsum Ceiling Board**—Exposed surfaces should receive two coats of good quality exterior paint. First coat: oil-based primer; second coat: either alkyd or latex exterior paint.
- 14 Shadowing**—During periods of low outside temperature, airborne dirt may collect, producing photographing or shadowing over fasteners and furring of exterior walls. This natural phenomenon occurs through no fault of the products.
- 15 WARNING: COMBUSTIBLE.** Rigid foam (cellular plastic) insulation will ignite if exposed to fire of sufficient heat and intensity. Use only as directed by the specific instructions accompanying the product.
- 16 Additional Information**—See technical folders in this series: *Construction Selector SA-100* for fire and sound-rated systems; *Gypsum Panels & Accessories SA-927* for information on system components; *Texture and Finish Products SA-933* for finishing product specifications; *DUROCK Cement Board Folder SA-932* for data on ceramic tile base.

Architectural Specifications

Part 1: General

1.1 Scope—Specify to meet project requirements.

1.2 Qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Environmental Conditions

In cold weather and during gypsum panel joint finishing, temperatures within the building shall be maintained within the range of 55° to 70°F (13° to 21°C). Adequate ventilation shall be provided to carry off excess moisture.

Part 2: Products

2.1 Materials

- A Gypsum Board**—48" wide—(¼") (⅜") (½") (¾") thick (Regular) (Foil-Back) SHEETROCK brand Gypsum Panels; (½") (¾") thick (Foil-Back) SHEETROCK brand Gypsum Panels, FIRECODE (C); (¾") (¾") thick SHEETROCK brand Gypsum Panels, Water-Resistant; (½") thick SHEETROCK brand Gypsum Panels, Water-Resistant, FIRECODE C; (¾") thick SHEETROCK brand Gypsum Panels, Water-Resistant, FIRECODE; (½") (¾") thick SHEETROCK brand (FIRECODE) Exterior Gypsum Ceiling Board; ½" thick SHEETROCK brand Interior Gypsum Ceiling Board—lengths as required.
- B Sheathing**—½" x (24" wide) (48" wide) SHEETROCK brand Gypsum Sheathing; ⅝" x (24" wide) (48" wide) SHEETROCK brand Gypsum Sheathing, FIRECODE; ½" x (24" wide) (48" wide) GYP-LAP Gypsum Sheathing; ⅝" x (24" wide) (48" wide) GYP-LAP (Type X) Gypsum Sheathing.
- C Joint Treatment**—(select a United States Gypsum Company Joint System).
- D Adhesive**
—(for Back-Blocking and Fire-Rated Double-Layer Systems)—SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type

(EASY SAND) Joint Compound or SHEETROCK Joint Compound Ready-Mixed—(All Purpose) (Taping).

—(for Non-Rated Double-Layer Systems)—Laminating or Liquid Contact Adhesive.

—(for Adhesive Application)—Drywall Stud Adhesive (must comply with ASTM C557 in partitions).

—(for Non-Rated Systems—specify with adhesive above).

—Vinyl Foam Tape.

E Fasteners

—Screws (1¼" Type W) (1½" Type G) (¾", 1", 1¼", 1½", 1¾", 1½" Type S) (1" Type S-12).

—(for Non-Rated Systems)—1¼", 1½" (Annular Ring Drywall) (Cement Coated Cooler) Nails—obtain locally.

—(for Fire-Rated Systems)—specify from fire test report.

—(for sheathing)—11-ga. (⅞") (1" dia. head galvanized roofing nails (1½") (1¾") long—obtain locally.

F SHEETROCK Trim No. (200-A) (401) (402) (P-1) (801-A) (801-B).

G Corner Bead—(No. 103 DUR-A-BEAD) (No. 104 DUR-A-BEAD) (SHEETROCK No. 800) Metal Corner Reinforcement.

H SHEETROCK Zinc Control Joint No. 093.

I RC-1 Resilient Channel.

J THERMAFIBER Sound Attenuation Fire Blankets (1½") (2") (3")x16" or 24"x48"; THERMAFIBER Fire-Safety FS-15 Blankets (1") (2") (3") (3½") (5¼") (6") x 15" or 23" x 48".

K Sealant—SHEETROCK Acoustical Sealant.

Part 3: Execution

3.1 Single-Layer Systems

3.1.1 Gypsum Panel Erection—Direct Attachment

Apply gypsum panels to ceilings first, then to walls. Place panels (perpendicular to framing) (parallel to framing). When using perpendicular application, position all ends over framing members. Use maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together. Stagger end joints in successive courses. Place end joints on opposite sides of partitions on different studs. When necessary, cut ends, edges and cutouts within field of panel in a workmanlike manner. Cut panels with a razor knife and straight edge. Avoid cutting with power tools. If cut with a power tool, tool must be equipped with a dust collector.

Drive fasteners in field of panel first, working toward ends and edges. Hold panel in firm contact with framing while driving fasteners. Space perimeter fasteners at least ⅜" from ends and edges. Drive nails home with heads slightly below surface of panels to provide a uniform dimple ⅛" deep. Do not use a nail set; avoid breaking face paper.

Attach gypsum panels to framing supports by:

- A Standard single nailing method**—Attach panels with specified nails spaced 7" o.c. max. for ceilings, 8" o.c. max. for walls.
- B Adhesive application**—Attach gypsum panels with drywall stud adhesive applied in a continuous ⅜" bead at center of attachment to face of framing members. Where two panels meet on a framing member, apply two beads permitting adhesive contact to both panels. Do not apply adhesive to members such as bridging, diagonal bracing, etc., into which no supplemental fasteners will be driven. Immediately following panel erection, apply fasteners per manufacturer's directions. Hand impact panel along framing to ensure contact at all points.
- C Double-nailing method**—Attach gypsum panels with nails spaced 12" o.c. with second nails in close proximity (2" away).
- D Power-driven screws**—Attach gypsum panels with 1¼" Type W screws—spaced 16" o.c. max. for walls, 12" o.c. for ceilings.

E Vinyl Foam Tape—Attach gypsum panels, using stud adhesive and 8" tape strips applied according to manufacturer's directions.

3.1.2 SHEETROCK brand Gypsum Panels, Water-Resistant, Erection

A Framing—If necessary, fur out studs so inside face of shower receptor is flush with gypsum panel face. Install appropriate blocking or headers to support tub and other plumbing fixtures, and to receive soap dishes, grab bars, towel racks and other hardware. When studs are more than 16" o.c., or when ceramic tile over $\frac{5}{16}$ " thick will be used, install suitable blocking between studs. Place blocking approximately 1" above top of tub or receptor and at midpoint between base and ceiling.

B Gypsum Panels—After tub, shower pan or receptor is installed, place temporary $\frac{1}{4}$ " spacer strips around lip of fixture. Pre-cut panels to required sizes and make necessary cut-outs. Before installing panels, brush thinned tile adhesive over all cut or exposed panel edges at utility holes, joints and intersections.

Install panels perpendicular with paperbound edge abutting top of spacer strip. Fasten panels with nails 8" o.c. max., or screws 12" o.c. max. Where ceramic tile more than $\frac{5}{16}$ " thick will be used, space nails 4" o.c. max. and screws 8" o.c. max. Adhesive application (see 3.1.1 B above) may be used for attaching panels when ceramic tile no more than $\frac{5}{16}$ " thick will be used.

In areas to be tiled, treat all fastener heads with SHEETROCK Setting-Type (DURABOND 45 or 90) or Lightweight Setting-Type (EASY SAND 45 or 90) Joint Compound. Fill tapered edges in gypsum panel with this SHEETROCK Setting-Type Compound, embed SHEETROCK Joint Tape firmly and wipe off excess compound. Follow immediately with a second coat over the taping coat, being careful not to crown the joint. Fold and embed tape properly in all interior angles to provide a true angle.

In areas not to be tiled, embed tape and treat fasteners with SHEETROCK Setting-Type (DURABOND 45 or 90) or Lightweight Setting-Type (EASY SAND 45 or 90) Joint Compound applied in the conventional manner. Finish with at least two coats of joint compound applied according to directions.

Prior to tile erection, seal cut panel edges of all openings around pipes, fittings and fixtures with thinned tile adhesive. Remove spacer strips, but do not caulk gap at bottom of panels.

Note—Using an adhesive approved by the tile manufacturer, install tile down to top edge of shower floor or tub and overlapping lip or return of tub or receptor. Fill all tile joints with an unbroken application of grout. Apply caulking compound between the tile and shower floor or tub.

3.1.3 Floating Interior Angle System

Apply gypsum panels to ceilings first. Follow standard framing practices for corner fastening. Fit panels snugly at all angles. Apply gypsum panels to walls to maintain firm support for ceiling panels. At horizontal angles, apply the first fastener 8" from the intersection. At vertical interior angles attach the overlapping panel only, at the angle. Use conventional fastening in remainder of area.

3.2 Double-Layer Systems

3.2.1 Base Layer Erection—Direct Attachment

A Ceilings—Apply gypsum panel base layer on ceilings first (perpendicular to framing) (parallel to framing). Position end joints to offset face layer joints by at least 10", joints may occur on or between framing members. Apply foil-back panels with foil side against framing.

B Sidewalls—Apply gypsum panel base layer with long edges centered on framing members (parallel). When predecorated face layers will be used, apply base layer horizontally. Apply foil-back

panels with foil side against framing. Attach panels to framing supports by (screw) (nail) attachment as follows:

C Screw Attachment—Attach panels with power-driven $1\frac{1}{4}$ " Type W screws spaced 16" o.c. max. for walls, 12" o.c. max. for ceilings. Stagger screws on adjoining edges and ends.

D Nail Attachment—Attach panels with specified nails spaced 8" o.c. max. for walls, 7" o.c. max. for ceilings. Drive nails so heads are flush with surface and opposite each other on adjacent ends and edges.

Drive fasteners in field of panel first, working toward ends and edges. Hold panel in firm contact with framing while driving fasteners. Space fasteners $\frac{3}{8}$ " min. from ends and edges.

3.2.2 Face Layer Erection—Direct Attachment

Use gypsum panels in maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together. Stagger joints at least 10" from parallel joints in base layer. When necessary, cut ends, edges and cutouts within field of panels in a workmanlike manner.

After panels are cut to size, mix and apply adhesive according to manufacturer's directions and laminate face layer to base layer in the following manner:

Sheet Lamination—For fire-rated construction on walls, apply specified SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound, or SHEETROCK Joint Compound Ready-Mixed (Taping or All Purpose) to entire back surface of face panels and to extreme edges of panels. Apply adhesive in beads approximately $\frac{3}{8}$ " wide at base and $\frac{1}{2}$ " high and spaced $1\frac{1}{2}$ " to 2" o.c. Laminate face layer to base layer using moderate pressure and temporary support or supplemental fastening as follows:

A Temporary nailing—Use double-headed nails with at least $\frac{3}{4}$ " penetration into framing. Space nails 16" to 24" o.c. When proper bond is developed, remove nails and dimple holes for joint treatment.

B Temporary supports—Brace or shore face layer every 16" to 24". When proper bond is developed, remove supports.

C Screws—Permanently attach face layer with $1\frac{1}{2}$ " Type G screws. Space screws along edges 36" o.c. max., within 2" of joint and 12" of both ends. In field of panel, space screws along centerline, 48" max. and within 24" of ends.

Strip Lamination—For fire-rated construction on walls, apply specified SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound, or SHEETROCK Taping or All Purpose Joint Compound Ready-Mixed to base layer panels in vertical strips of four $\frac{1}{2}$ " beads, $1\frac{1}{2}$ " to 2" o.c. Space strips 24" o.c. Permanently attach face layer with $1\frac{1}{2}$ " Type G screws placed to penetrate adhesive strips. Space screws along edges 36" o.c. max., within 2" of joint and 12" of both ends. In field of panel, space screws along centerline, 48" o.c. max. and within 24" of both ends.

For non-rated construction, laminate face to base layer as follows:

Laminating Adhesive—Apply adhesive in strips using notched spreader having $\frac{1}{4}$ "x $\frac{1}{4}$ " min. notches spaced 2" o.c. max. Apply strips to back of face panel in center and along both edges. Position panel, press firmly in place and fasten as required. For walls, use pre-bowed panels, erect panels vertically and fasten 16" o.c. at top and bottom of panel. For ceilings, space fasteners 16" o.c. along edges and ends, with one permanent fastener per framing member at mid-width of panel.

Liquid Contact Adhesive—Apply adhesive to both contact surfaces according to manufacturer's directions; let adhesive air-dry; erect panels as soon as possible after drying. Position panel, press panel firmly in place and fasten as required. For perpendicular application

to walls and for all ceiling applications, fasten face panel at each corner and along edges spaced 48" o.c. max. For parallel application to walls, use pre-bowed panels and fasten 16" o.c. at top and bottom of panel.

Vinyl Foam Tape—Attach gypsum panels, using laminating adhesive and vinyl foam tape applied in continuous strips across back face of panel according to manufacturer's directions.

For mechanical attachment in non-rated construction, space nails 7" o.c. on ceilings, 8" o.c. walls; space screws 12" o.c. on ceilings, 16" o.c. on walls.

3.2.3 Face Layer Erection—TEXTONE Vinyl-Faced Gypsum Panels

Before application, pre-bow panels to a 2" permanent bow convex to face of studs. Apply pre-bowed panels vertically with joints staggered at least 10" from parallel joints in base layer. Position less-than-full-width panels with cut edge at corner. When necessary, cut ends, edges and cutouts within field of panels in a workmanlike manner.

For fire-rated construction, install panels using specified SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound, or SHEETROCK Taping or All Purpose Joint Compound Ready-Mixed as laminating adhesive. Apply adhesive to base layer in vertical strips of four ½" beads, 1½" to 2" o.c. Space strips 24" o.c. Fasten panels 16" o.c. at top and bottom of panel.

For non-rated construction, install face layers, using (laminating) (liquid contact) adhesive as follows:

A Laminating Adhesive—Apply adhesive in strips using notched spreader having ¼"x ¼" min. notches spaced 2" o.c. max. Apply strips to back of face panel in center and along both edges. Position panel, press firmly in place and fasten 16" o.c. at top and bottom.

B Liquid Contact Adhesive—Apply adhesive to both contact surfaces according to manufacturer's directions; let adhesive air-dry; erect panels as soon as possible after drying. Position panel, press firmly in place and fasten 16" o.c. at top and bottom.

Finish joints, edges, corners with TEXTONE Mouldings matching panel finishes and installed according to manufacturer's directions.

3.3 Resilient Attachment Systems

3.3.1 Resilient Channel Erection

Position resilient channels at right angles to wood framing, space (16") (24") o.c. and attach to each support with 1½" Type W or 1½" Type S screws driven through holes in channel mounting flange.

On walls, install channels with mounting flange down. (Channel may be inverted at floor to accommodate attachment of base.) Locate channels 2" from floor and within 6" of ceiling. Extend channels into all corners and attach to corner framing. Position channels max. 6" from wall-ceiling angle. Cantilever channel ends no more than 6". For double-layer system, attach channel through base layer to framing with 1½" Type S screws. Splice channel by nesting directly over framing member, screw-attach through both flanges. Reinforce with ¾" pan head screws located at both ends of splice. Use of a filler strip at the base may reduce STC rating.

Where cabinets are to be installed, attach RC-1 Resilient Channels to studs at center of top and bottom cabinet hanger brackets. When distance between hangers exceeds 24" o.c., install additional channel at mid-point between hangers.

Note: Screws attaching cabinets to resilient channels should be placed between studs. Screws that contact studs reduce the system's resiliency and sound rating.

3.3.2 Gypsum Panel Erection—Ceilings

A Base Layer—For fire-rated assembly, apply gypsum base-layer panels with long edges across joists and end joints staggered.

Fasten panels to framing with 8d cement-coated nails spaced 7" o.c. Attach resilient channel through base layer perpendicular to framing with 1½" Type S screws spaced 24" o.c. for joists 16" o.c.; spaced 16" o.c. for joists 24" o.c.

B Face Layer—Apply face-layer panels of maximum practical length with long dimension perpendicular to resilient channels and end joints staggered. End joints may occur over resilient channels or midway between channels with joint floated and back-blocked. Fit ends and edges closely, but not forced together. Fasten panels to channels with 1" Type S screws spaced 12" o.c. in field of panels and along abutting ends. Cut panels neatly and provide support at cutouts and openings.

3.3.3 USG High Performance Floor/Ceiling System

A Floor—Apply ¾" bead of SHEETROCK Acoustical Sealant to the center of the top flange of the joists. Place ½" thick min. APA span rated exterior grade plywood sheets with long dimension across wood joists spaced 16" o.c. Fasten plywood to wood joists with (6d)(8d) cc sinkers 6" o.c. along supported ends and 10" o.c. at intermediate joists.

Install SHEETROCK brand Gypsum Liner Panels after the structure is fully enclosed and all interior partitions are installed. Loose lay the liner panels on the subfloor with the long dimension at a right angle to the wood joists. Stagger panel end joints and fit panels closely to wall intersections without forcing. Seal the perimeter of the floor with SHEETROCK Acoustical Sealant to provide an airtight seal.

Finish floor with DUROCK Exterior Cement Board and ceramic tile or oriented strand board and vinyl tile or carpet. See Technical Data Sheet WB-1868 for installation information. (Note: SHEETROCK brand Gypsum Liner Panel floor underlayment is not intended for use in areas subject to prolonged contact with water—e.g., gang showers, etc. For applications in these areas, substitute a double layer of ½" DUROCK Exterior Cement Board for gypsum liner panels to achieve comparable fire- and sound-rated performance).

B Cavity—Install 3" thick THERMAFIBER SAFB to fit snugly between all floor joists. Support each batt with four spring steel wire rods (0.087" dia. typical) uniformly spaced to hold the batts approximately 1" above the bottom of the joists. Butt ends tightly and fill all voids.

C Ceiling—Apply RC-1 Resilient Channels 16" o.c. perpendicular to joists and fastened with 1½" Type S screws. Attach base layers of ¾" SHEETROCK brand Gypsum Panels, FIRECODE C Core, perpendicular to channels with 1" Type S screws 16" o.c. at channels, 8" o.c. at panel ends. Attach face layers with 1½" Type S screws 8" o.c. at channels, with 1½" Type G screws 8" o.c. at panel ends, staggering screws 4" from screws in base layer. Treat joints and fasteners with SHEETROCK joint system. Seal perimeter with SHEETROCK Acoustical Sealant.

3.3.4 Gypsum Panel Erection—Walls

Apply resilient channel per 3.3.1. Apply gypsum panels of maximum practical length with long dimension parallel to resilient channel and fastened with 1" Type S screws spaced 12" o.c. along channels. Center horizontal abutting edges over screw flange of channel. Where channel resiliency makes screw placement difficult, the next longer screw may be used, but do not drive screw directly over stud. For direct attachment, fasten panels to wood studs with 6d nails 8" o.c.

For two-layer application of gypsum panels, apply base layer perpendicular to resilient channels and attach to channels with 1" Type S screws spaced 24" o.c. and to wood studs with 1½" Type W

screws 16" o.c. Apply face layer with long dimension perpendicular to long edges of base layer and fasten with 1½" Type S screws 16" o.c.

3.4 Wall Furring Systems

3.4.1 Single-Layer Application—Direct Attachment

Space suitable wood furring strips 16" o.c. and attach to masonry walls. Apply gypsum panels of maximum practical length with long dimension perpendicular to furring strips. Fasten panels with 1½" Type W screws spaced 16" o.c. Apply foil-back panels with foil side against furring. Where there is a possibility of water penetration through exterior walls, install an asphalt felt strip between furring strips and wall.

3.4.2 Mechanical Application—SHEETROCK Z-Furring Channels

Erect insulation vertically on interior of masonry and concrete walls and hold in place with SHEETROCK Z-Furring Channels spaced 24" o.c. Except at exterior corners, attach narrow flanges of furring channels to wall with concrete stub nails or power-driven fasteners spaced 24" o.c. At exterior corners, attach wide flange of furring channel to wall with short flange extending beyond corner. On adjacent wall surface, screw attach short flange of furring channel to web of attached channel. Start from this furring channel with a standard width insulation panel and continue in regular manner. At interior corners, space second channel no more than 12" from corner and cut insulation to fit. Hold mineral-fiber insulation in place until gypsum panels are installed with 10" long staple field-fabricated from 18-ga. tie wire and inserted through slot in channel. Apply wood blocking around window and door openings and as required for attachment and support of fixtures and furnishings.

Apply gypsum panels parallel to channels with edge joints occurring over channels. Use no end joints in single-layer application. Attach gypsum panels with 1" Type S screws spaced 16" o.c. in field of panels and at edges, and with 1½" Type S screws spaced 12" o.c. at exterior corners. For double-layer application, apply base layer parallel to channels, face layer either perpendicular or parallel to channels with vertical joints offset at least one channel. Attach base layer with screws 24" o.c. and face layer with 1½" screws 16" o.c.

3.5 Gypsum Sheathing Application

Apply 24" wide sheathing horizontally with tongue edge up. Install supplementary bracing as required by applicable code. Fasten sheathing with nails spaced 8" o.c. along each stud.

Apply 48" wide sheathing vertically with bottom edge bearing on foundation or subfloor. Install supplementary bracing (and adhesive) as required by applicable code. Fasten sheathing to studs and plates with nails 8" o.c.

3.6 Exterior Ceilings and Soffits

Apply SHEETROCK brand Exterior Gypsum Ceiling Board (perpendicular to supports) (parallel to supports) with end joints over supports and with ½" to ¾" space between butted ends of boards. Use maximum practical lengths to minimize end joints. Fasten boards to supports with screws spaced 12" o.c. or nails spaced 8" o.c. Where specified, cover joints with wood battens securely fastened to framing. Finish joints, trim and fasteners with SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound applied according to directions.

3.7 Accessory Application

A Joint System—Finish all face panel joints and internal angles with a United States Gypsum Company Joint System applied according to manufacturer's directions. Spot exposed fasteners on face layers and finish corner bead, control joints and trim as required, with at least three coats of joint compound, feathered out onto panel faces and sanded smooth.

B Corner Bead—Reinforce all vertical and horizontal exterior corners with corner bead fastened with nails or ⅝" galvanized staples 9" o.c. on both flanges along entire length of bead.

C Metal Trim—Where partition or ceiling terminates against masonry or other dissimilar material, apply metal trim over gypsum panel edge and fasten with nails or galvanized staples 9" o.c.

D P-1 Vinyl Trim—Slip trim over gypsum panel edge with long flange behind panel. Install panel with trim firmly abutting surface.

E Screws—Power-drive at least ⅜" from edges or ends of gypsum panels to provide uniform dimple ⅛" deep.

F Control Joints—Break gypsum panels and resilient channels behind joint and back by double supports. Apply acoustical sealant to fill gap and attach control joint to face layer with nails or ⅝" galvanized staples spaced 6" o.c. on both flanges along entire length of joint.

Product Information and Literature: 1-800-USG-4YOU.

Metric Specifications: USG Corporation, through its operating subsidiaries, will provide metric conversions on its products and systems to help specifiers match metric design sizes. In addition, some products are available in metric dimensions from selected manufacturing plants. Refer to SA-100 Construction Selector for additional information and a Table of Metric Equivalents.

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United States Gypsum Company

125 South Franklin Street

P.O. Box 806278

Chicago, Illinois 60680-4124

A Subsidiary of USG Corporation

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USG Area Separation Fire Wall/Party Wall Systems



For multi-family residential fire wall construction

USG

Description

USG Area Separation Fire Walls/Party Walls are remarkable developments for constructing common walls with fire-resistive protection for adjacent properties. These lightweight, non-load bearing gypsum drywall assemblies are designed as vertical fire barriers for fire walls and party walls separating occupancies in wood-frame apartments and townhouses. They are the essence of simplicity—large-size gypsum panels used in construction with steel studs and runners quickly become thin, space-saving walls offering remarkable acoustical privacy. Their engineered performance and low labor and material costs make these systems superior to the usual masonry construction.

Available in two basic systems both providing fire-resistant walls from ground level to roof:

Solid Type, with independently framed interior gypsum panel surfaces for both sides of fire wall or party wall.

Cavity Type, with integral interior gypsum panel surfaces for commonly shared party walls between apartments.

Solid-Type Wall consists of two 1" thick SHEETROCK brand Gypsum Liner Panels installed vertically between 2" USG Steel C-Runners. Panel edges are inserted in 2" USG Steel H-Studs spaced 24" o.c. C-runners are installed at top and bottom of wall and back-to-back between vertical panels cut to a convenient length above each intermediate floor. Studs are attached to wood framing at intermediate floors with 0.063" USG aluminum angle clips which break away when exposed to fire, thus permitting a fire-damaged structure to fail while the fire barrier remains intact. Refer to Architectural Specifications for exact clip placement.

With 25-ga. steel H-studs, the assemblies are suitable for floor-to-ceiling heights (i.e. between clip angle supports) up to 10' under 5-psf lateral load and up to 8' as an exterior wall under 15-psf wind load without exceeding L/240 allowable deflection.

With 2" THERMAFIBER Sound Attenuation Fire Blankets (SAFB) stapled each side of liner panels, the assembly has obtained a 3-hr. fire resistance rating allowing separate selection and construction of tenant walls.

Cavity-Type Wall consists of steel C-H Studs and SHEETROCK brand Gypsum Liner Panels set in steel runners and faced both sides with SHEETROCK brand Gypsum Panels, Water-Resistant, FIRECODE C Core. Liner panels, 1" thick, are erected vertically with ends set into 2½" USG C-Runners and edges inserted into specially formed 2½" USG Steel C-H Studs. C-runners are installed singly at top and bottom of wall and back-to-back between vertical liner panels on a line above each intermediate floor. Aluminum clips, which attach the studs to adjacent wood framing, break away in the same fashion as with solid-type walls. To improve sound transmission loss, THERMAFIBER SAFB are inserted in the stud cavity and RC-1 Resilient Channels (part of the family of SHEETROCK Metal Products) may be used to isolate the face layer.

With 212CH25 steel studs spaced 24" o.c., the systems are suitable for floor-to-ceiling heights up to 10' under 5-psf lateral load and up to 8' as exterior walls under 15-psf wind load without exceeding L/240 deflection. For buildings over 23' in height, use 400CH20 studs on the lower floors below the top 23' of the building.

Components used in these systems are designed to permit temporary exposure to inclement weather during construction. Construction using the USG Aluminum Breakaway Clip is covered by U.S. Patent No. 3,974,607.



a



c



b

a. USG Steel H-stud slides in place over SHEETROCK brand Gypsum Liner Panels.

b. USG Steel C-Runner fits over studs and panels. Second C-runner is then screw-attached back-to-back to lower runner to hold next level of studs and liner panels.

c. USG Aluminum Breakaway Clip is screw-attached to studs and framing. Under fire exposure, clip breaks away, permits fire-damaged wall to fail, leaving separation wall intact.

Function and Utility

These systems may be used in buildings up to four stories high (44') and with all common floor-ceiling heights found in multi-family housing. Both cavity and solid types are suitable for exterior walls with appropriate weather-resistant facing when building offsets are desired; also for use with flat wood decks.

Fire Resistance—Both types of Separation Walls offer 2-hr. and 3-hr. fire ratings.

Sound Isolation—STC ratings up to 60 with the solid system and 57 in the cavity system are available.

Lightweight—These drywall assemblies weigh at least 50% less than masonry walls. This fact speeds installation.

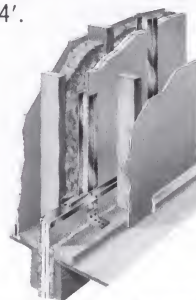
Space-Saving—Use of these assemblies gains valuable floor space. Thickness is 3½" to 4" for Cavity Type Walls, compared to 8" to 12" for a masonry wall without interior finish.

Weather Resistance—Moisture-resistant components permit installation in any weather—eliminate many costly winter construction delays.

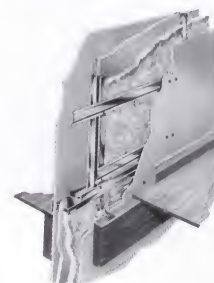
Code Compliance—In compliance with fire resistance requirements under evaluation reports of BOCA Report No. 87-63 and SBCCI Report No. 9137.

Limitations

Non-load bearing; max. frame spacing: 24"; not recommended for shear walls without suitable diagonal bracing; max. building height: 44'.



Solid-type

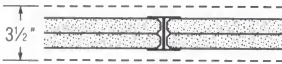
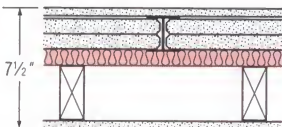
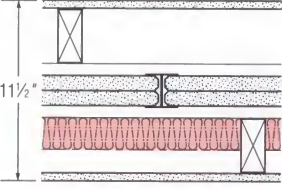
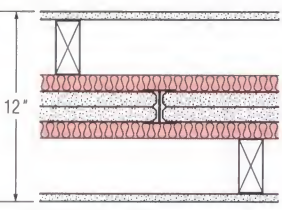
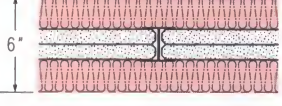


Cavity-type


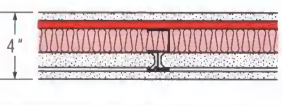
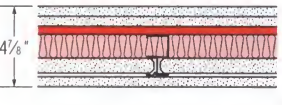
Test Data—Solid Walls

■ RC-1™ Resilient Channel

■ THERMAFIBER Insulation*

Fire rating	Fire-rated construction Detail & physical data	Description & test no.	Acoustical performance		System reference
			STC	Description & test no.	
2 hr.		Solid Area Separation Wall—two 1" SHEETROCK brand gypsum liner panels set betw USG one-piece steel H-studs 24" o.c.—min. 1/2" air space both sides separating liner panels from any adjacent combustible construction— UL Des U336	N/A		A
2 hr.		Solid Area Separation Wall—two 1" SHEETROCK brand gypsum liner panels set betw USG one-piece steel H-studs 24" o.c.—1" THERMAFIBER SAFB stapled over gypsum liner panels—1/2" SHEETROCK brand gypsum panels—perim caulked—fire rating based on WHI-495-PSV-0245	47	Based on no SAFB— TL-88-234	B
2 hr.		Solid Area Separation Wall—1/2" SHEETROCK brand gypsum panels—two 1" SHEETROCK brand gypsum liner panels set betw USG one-piece steel H-studs 24" o.c. 2x4 wd studs 16" o.c. each side on 2x4 plates min. 3/4" from liner panels—2" THERMAFIBER SAFB in one cavity—gypsum panels att with 1 1/2" Type W screws 12" o.c.—joints stag & fin.—perim caulked— UL Des U336	54 46 58 57 60 45 54 57	TL-88-348 Based on 2x4s and no SAFB— TL-88-353 Based on 2x4s and 2" SAFB on both sides— TL-88-347 Based on 2x4s and 3" SAFB on one side— TL-88-351 Based on 2x4s and 3" SAFB both sides— TL-88-350 Based on 2x3s, 3/4" gypsum panels, no SAFB— BBN-730104 Based on 2x3s, 3/4" gypsum panels, 2" SAFB one side— BBN-730103 Based on 2x3s, 3/4" gypsum panels, 2" SAFB both sides— BBN-730102	C
2 hr.		Solid Area Separation Wall—two 1" SHEETROCK brand gypsum liner panels set betw USG one-piece steel H-studs 24" o.c.—2x4 wd studs 16" o.c. each side on 2x4 plates min. 3/4" from liner panels—1" THERMAFIBER SAFB stapled to both sides of liner panels—1/2" SHEETROCK brand gypsum panels facing ea side— WHI-495-PSV-0245	53 50	TL-88-346 Based on 1" SAFB one side— TL-88-344	D
3 hr.		Solid Area Separation Wall—two 1" SHEETROCK brand gypsum liner panels set betw USG one-piece steel H-studs 24" o.c.—2" THERMAFIBER SAFB both sides—blks appl horiz with joints stag and staple-att to liner panels— WHI-495-0393/0394	N/A		E

Test Data—Cavity Walls

Fire rating	Fire-rated construction Detail & physical data	Description & test no.	Acoustical performance		System reference
			STC	Description & test no.	
2 hr		Cavity Area Separation Wall—1/2" SHEETROCK brand gypsum panels, water-resistant, FIRECODE C core—1" SHEETROCK brand gypsum liner panels set betw USG 25-ga. steel C-H studs 24" o.c.—single layer panels ea side appl vert & screw att—joints stag on opp sides & fin—perim caulked— UL Des U467 wt 9 width 3 1/2"	47	Based on 1" SAFB in cavity— BBN-750704	A
2 hr. est		Cavity Area Separation Wall—1/2" SHEETROCK brand gypsum panels, water-resistant, FIRECODE C core—1" SHEETROCK brand gypsum liner panels set betw USG 25-ga. steel C-H studs 24" o.c.—RC-1 chan 24" o.c. screw att to side opp liner panels—1 1/2" THERMAFIBER SAFB—single layer panels ea side appl vert & screw att—joints stag on opp sides & fin—perim caulked—est. fire rating based on UL Des U467 wt 10 width 4"	50	Based on 1/2" SHEETROCK brand gypsum panels, FIRECODE C core— BBN-750411	B
3 hr. est		Cavity Area Separation Wall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—1" SHEETROCK brand gypsum liner panels set betw USG 25-ga. steel C-H studs 24" o.c.—RC-1 chan 24" o.c. screw att to side opp liner panels—1 1/2" THERMAFIBER SAFB—single layer panels one side appl vert & screw att—2 layers opp side screw att to chan—base layer appl horiz—face layer appl vert—joints stag & fin—perim caulked—est. fire rating based on U of C 2-16-72 wt 14 width 4 1/4"	57	BBN-730622	C

* Where thermal insulation is shown in assembly drawings, the specific product is required in the assembly to achieve the stated fire rating. Fiberglass insulation can not be substituted for THERMAFIBER Insulation.

Solid Wall Description

Two-hour fire rated solid area separation walls consist of a fire barrier of two 1" SHEETROCK brand Gypsum Liner Panels inserted between USG Steel H-Studs 24" o.c. set in runners. This barrier wall is finished one or both sides with 1/2" SHEETROCK brand Gypsum Panels, 1/2" SHEETROCK brand Gypsum Panels, FIRECODE C Core, or 3/4" SHEETROCK brand Gypsum Panels, FIRECODE Core, applied direct to USG Steel H-Studs or to separate framing. With 2" THERMAFIBER

SAFB stapled to each side of liner panels, the assembly offers 3-hr. fire resistance. Check local code for acceptable system.

Sound isolation up to 57 STC is offered depending on the interior wall construction used. Systems using steel studs or wood studs provide the same sound control. Based on the location in the building the area separation wall can be varied to provide the framing and finish desired. Consult local code for limiting criteria.

Solid Wall Sound Transmission Loss—db

Test no.	Method	Band center frequency—Hz																STC
		125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	
TL-88-350	Lab	40	45	50	49	53	53	55	57	62	65	67	69	72	70	68	71	60
TL-88-347	Lab	34	40	48	48	50	52	55	56	61	64	66	69	72	70	69	73	58
BBN-730102	Lab	36	38	46	52	53	56	57	56	59	59	59	60	59	57	58	66	57
TL-88-351	Lab	36	36	45	47	51	52	54	56	61	64	66	69	72	71	69	73	57
BBN-730103	Lab	34	33	43	51	52	54	57	56	60	60	58	60	60	57	58	66	54
TL-88-348	Lab	31	33	42	45	48	49	52	54	59	63	65	68	70	68	67	71	54
TL-88-346	Lab	29	32	44	45	49	49	50	51	57	62	65	68	71	69	67	69	53
TL-88-344	Lab	29	29	37	43	46	44	47	49	55	61	64	66	70	70	69	71	50
TL-88-234	Lab	31	28	31	34	38	42	44	49	52	55	58	60	61	62	61	63	47
TL-88-353	Lab	26	25	29	35	39	45	47	52	58	61	65	69	71	67	67	70	46
BBN-730104	Lab	28	24	28	37	40	46	50	53	58	60	59	60	58	57	59	66	45

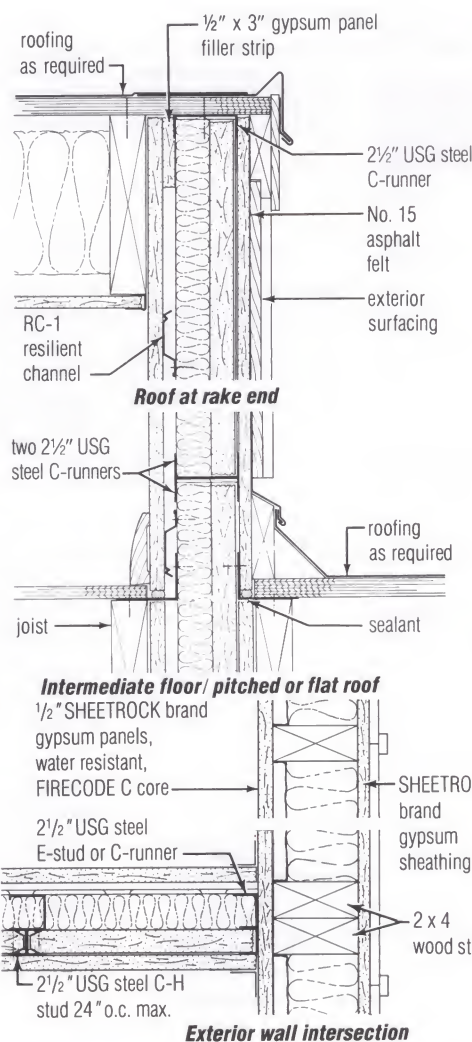
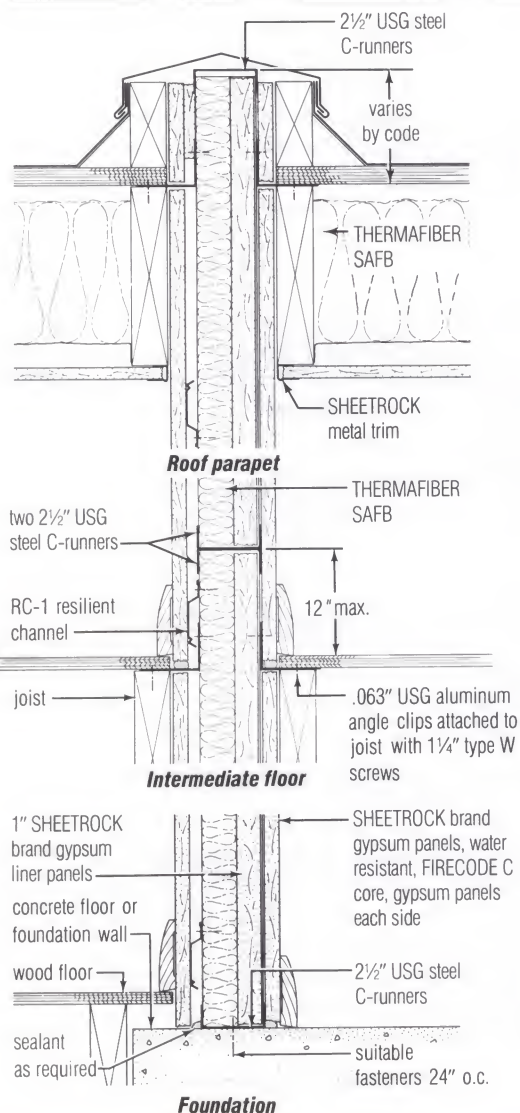
Cavity Wall Description

Cavity area separation walls are used as a commonly shared party wall and fire barrier with non-load bearing framing. They consist of USG Steel C-H Studs and 1" SHEETROCK brand Gypsum Liner Panels set in USG Steel C-Runners and faced both sides with ½" SHEETROCK brand Gypsum Panels, Water-Resistant, FIRECODE C Core.

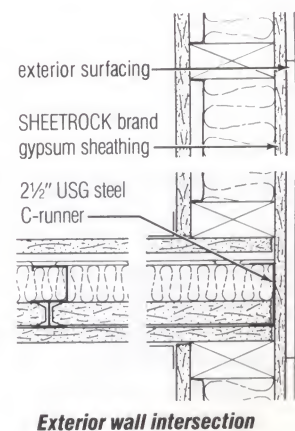
Cavity Wall Sound Transmission Loss—db

Test no.	Method	Band center frequency—Hz																STC
		125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	
BBN-730622	Lab	35	38	44	50	51	55	56	55	61	63	62	65	65	60	57	64	57
BBN-750411	Lab	26	32	42	44	48	51	53	54	58	60	59	61	61	57	56	60	50
BBN-750704	Lab	23	26	35	39	43	48	49	51	54	58	58	60	60	55	51	53	47

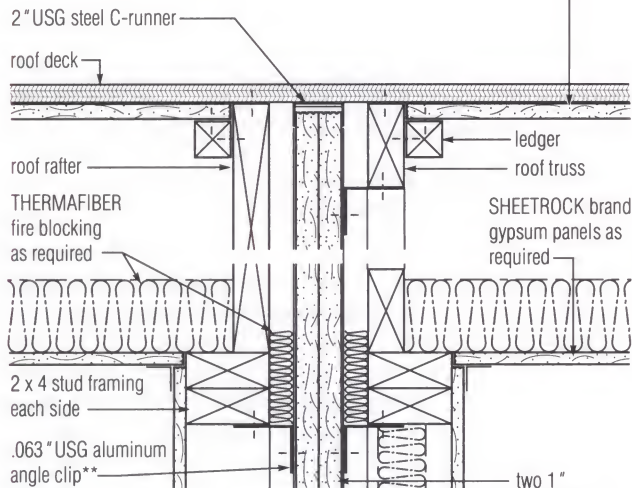
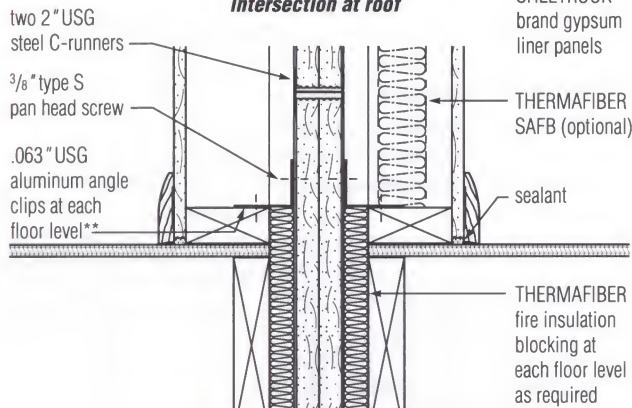
scale: 1½" = 1'-0"



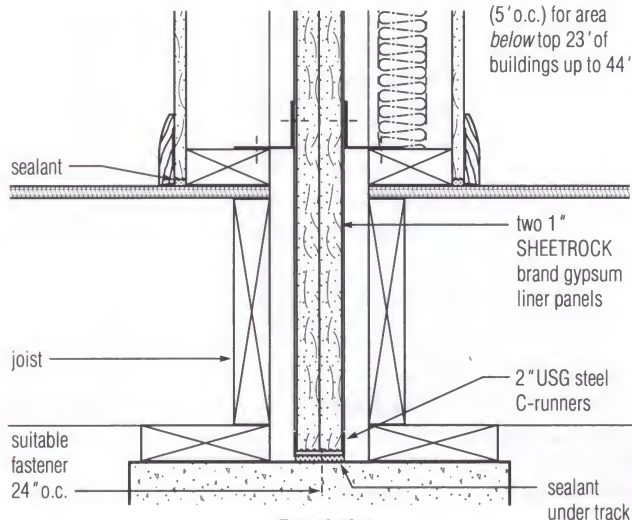
Note: Use 400CH20 studs for area below top 23' of building up to 44'. Clip placement may vary but not to exceed 10' o.c.



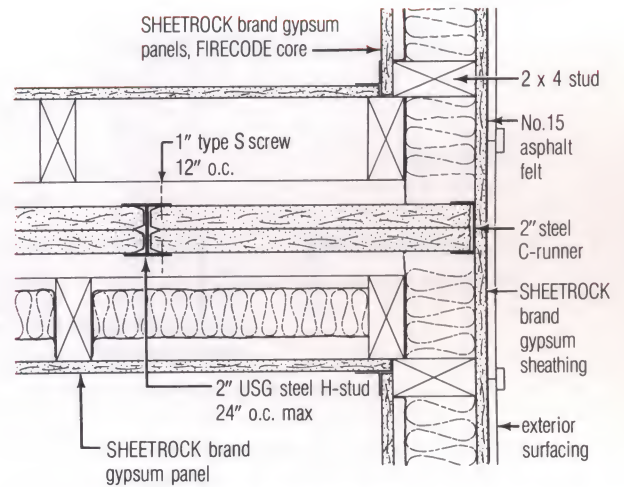
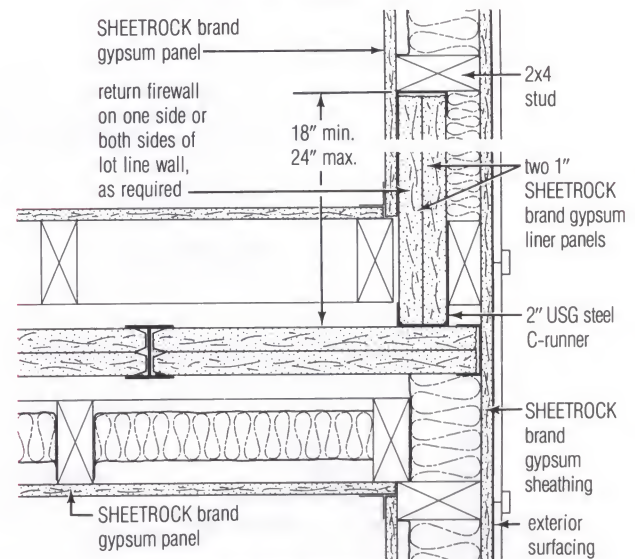
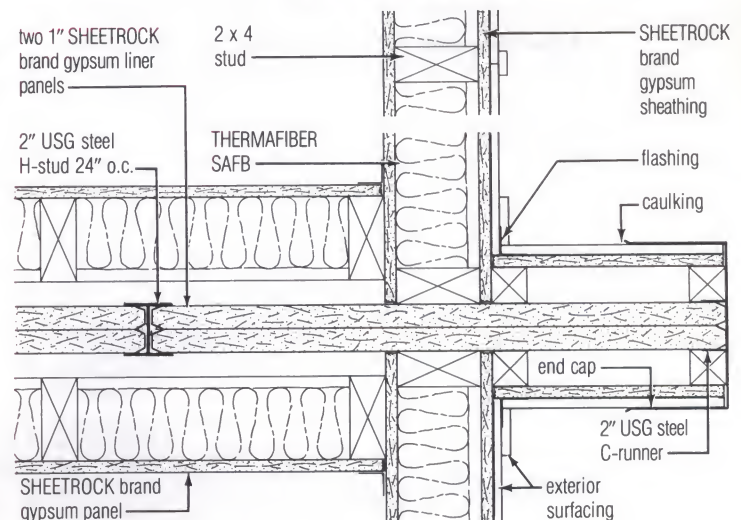
Note: As required by code, $\frac{5}{8}$ " SHEETROCK brand gypsum panels, FIRECODE core, may be used as underlayment to the untreated roof sheathing with panels extending 4' on both sides of area separation wall and possibly roof side at rake end.

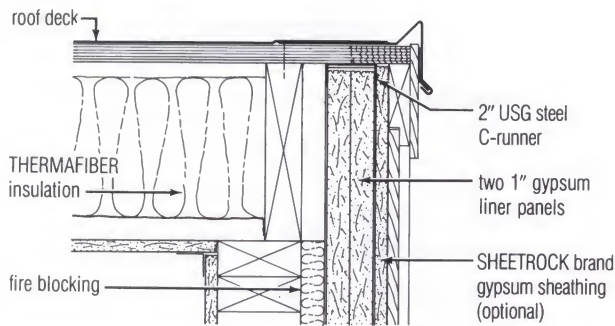
**Intersection at roof**

Note: Clip placement below is for typical construction.

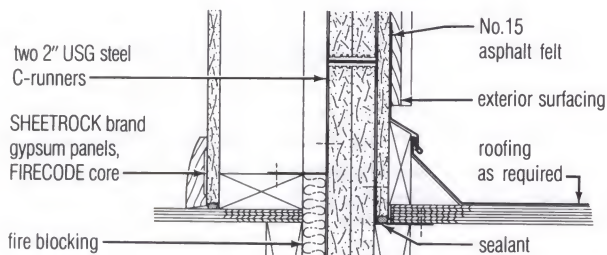
Intermediate floor**Foundation**

Note: additional clip angles are needed midheight between floors (5' o.c.) for area below top 23' of buildings up to 44'

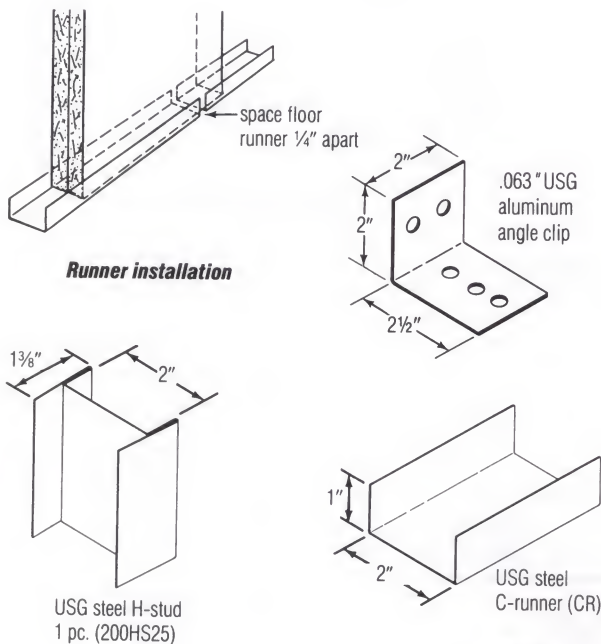
scale: 1 $\frac{1}{2}$ " = 1'-0"**Exterior wall intersection****Exterior wall intersection****Wing wall**



Roof at rake end



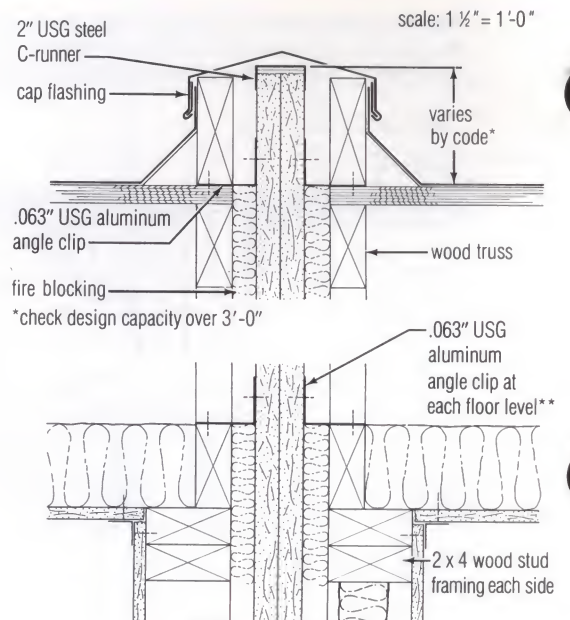
**Intermediate floor
pitched or flat roof**



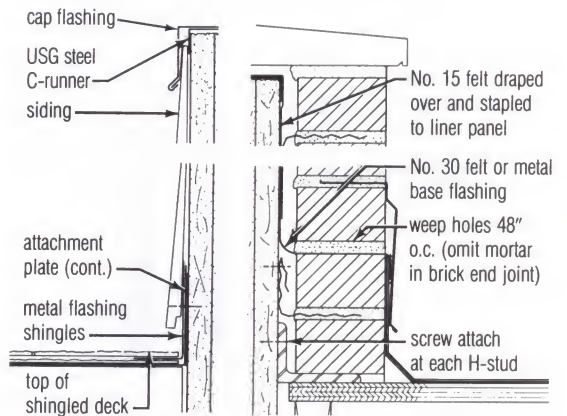
Runner installation

Steel components (solid wall)

****Note:** additional angle clips are needed midheight between floors (5' o.c. max.) for area below top 23' of building up to 44'.

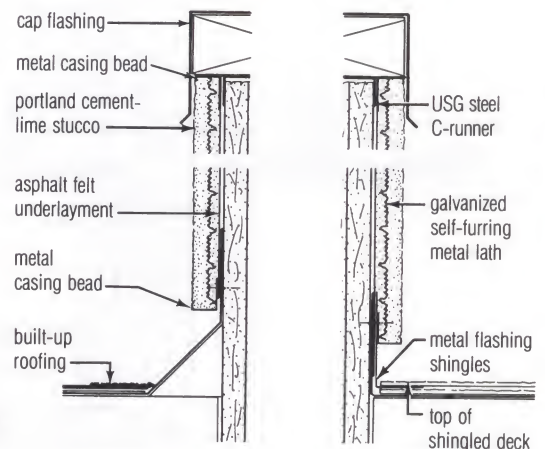


Typical roof parapets
(Height as required by code)



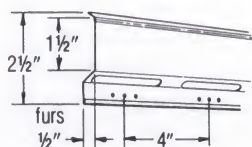
Wood siding

Masonry veneer

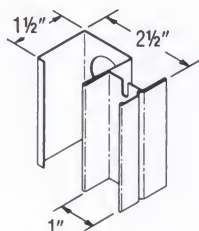


Stucco

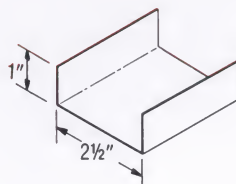
Stucco

Steel components (cavity wall)

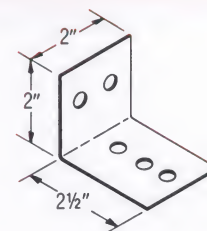
RC-1™ Resilient Channel



USG Steel C-H Stud (CH)



USG Steel C-Runner (CR)



.063" USG Aluminum Angle Clip

Good Design Practices

- 1 System Performance**—United States Gypsum Company will provide test certification for published fire, sound and structural data covering systems designed and constructed according to its published specifications. Tests are conducted on Company products manufactured and assembled to meet performance requirements of established test procedures specified by various agencies. System performance following substitution of materials or compromise in assembly design cannot be certified; failure may result under critical conditions.
- 2 Control Joints**—Location of control joints is the responsibility of the design professional/architect. Gypsum panel surfaces should be isolated with control joints or other stress relief where: **(a)** partition abuts a structural element (except floor) or dissimilar wall or ceiling; **(b)** construction changes within the plane of the partition; **(c)** partition run exceeds 30'; **(d)** expansion or control joints occur in the base exterior wall.
- 3 Sound Control Construction**—Where these constructions are used for sound control, seal the partition perimeter with 1/4" min. round bead of SHEETROCK Acoustical Sealant. Seal around all cutouts for lights, cabinets, pipes, ducts and electrical boxes. Flanking paths and back-to-back penetrations of the diaphragm should be eliminated. Exterior wall surfaces should be resiliently mounted to minimize flanking paths between floor and ceiling construction. Door and borrowed-light openings are not recommended.
- 4 Wood Framing Requirements**—Wood framing meeting the minimum requirements of local building codes is necessary for proper performance.
- 5 Fixture Attachment**—Lightweight fixtures and trim should be installed using expandable anchors for screw attachment. Medium and heavyweight fixtures are not recommended on resilient surfaces, but if required, they should be supported from the primary framing.
- 6 Cavity Type Walls**—SHEETROCK brand Gypsum Panels, FIRECODE C Core, may be used when partitions will not be exposed to moisture or inclement weather during construction. If weather exposure is expected, panels must be protected.
- 7 Additional Information**—See technical folders in this series: *Construction Selector SA-100* for fire and sound-rated systems; *Gypsum Panels and Accessories Folder SA-927* for information on systems components; *Texture and Finish Products Folder SA-933* for finishing product specifications; *THERMAFIBER Life-Safety Fire Containment Systems Folder SA-707* for insulation specifications.

Architectural Specifications**Part 1: General**

1.1 Scope—Specify to meet project requirements.

1.2 Qualifications

- A** All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.
- B** System must be recognized by and built in accordance with model code report.
- C** Solid-type wall must obtain a 2-hr. fire rating without the use of battens covering steel components.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises. Installed panels should be protected from the environment and dry before enclosing the wall.

1.4 Environmental Conditions

In cold weather and during gypsum panel joint finishing, temperature within the building shall be maintained within the range of 55° to 70° F (13° to 21° C). Adequate ventilation shall be provided to carry off excess moisture.

Part 2: Products**2.1 Materials**

- A** Gypsum Board—48" wide, (1/2") (3/4") thick (Regular) (Foil-Back) SHEETROCK brand (Water-Resistant) (FIRECODE C) (FIRECODE) Gypsum Panels—lengths as required.
- B** Liner Board—24" wide, 1" SHEETROCK brand Gypsum Liner Panels, beveled edge, lengths as required.
- C** USG Steel H-Studs one piece (200HS25), hot-dipped galvanized, lengths as required.
- D** USG Steel C-H Studs (212CH25) (400CH20) (600CH20), hot-dipped galvanized, lengths as required.
- E** USG Steel E-Studs 212ES25, hot-dipped galvanized, lengths as required.
- F** USG Steel Runners (200CR25) (212CR25), hot-dipped galvanized, x 10' length.
- G** USG Aluminum Angle Clip—2" x 2 1/2" x 0.063" Aluminum Breakaway Clips.
- H** Joint Treatment—(select a United States Gypsum Company Joint System).
- I** Fasteners—Screws (1 1/4" Type W) (1", 1 1/4", 1 3/8" Type S) (3/8" Type S, pan head) (Galvanized staples, 3/16" crown, 1 1/2" leg).
- J** SHEETROCK Trim No. (200-A) (401) (402) (801-A) (801-B).
- K** SHEETROCK Zinc Control Joint No. 093.
- L** RC-1 Resilient Channel.
- M** THERMAFIBER Sound Attenuation Fire Blankets (1") (1 1/2") (2") (3") x 16" or 24" x 48".
- N** SHEETROCK Acoustical Sealant.
- O** THERMAFIBER Safing Insulation.

Part 3: Execution

3.1 Solid Wall

- A Foundation**—Position 2" wide steel C-runner at floor and securely attach to foundation with power-driven fasteners at both ends and spaced 24" o.c. Space adjacent runner sections ¼" apart. When specified, caulk runner at foundation with ¼" bead of acoustical sealant.
- B First Floor**—Install H-studs and liner panels at a convenient length more than floor-to-floor height. Install two thicknesses of 1" liner panels vertically in C-runner with long edges in H-stud. As an option, H-stud and C-runner may be screw-attached at the end that is fully engaged to runner. Erect H-studs and double-thickness liner panels alternately until wall is completed. Cap top of panels with horizontal C-runner. Fasten all corner C-runner flanges both sides with ¾" Type S screws.
- C Intermediate Floors**—Install back-to-back C-runners and screw-attach together with double ¾" Type S screws at ends and spaced 24" o.c. Secure studs to framing with 0.063" aluminum angle clips screw-attached to both sides of each stud and framing. Locate horizontal runner joint within 2' of intermediate floor. Except at foundation, install fire stopping between joists and fire barrier.
- D Roof**—Continue erecting studs and panels for succeeding stories as described. Cut liner panels and H-studs to pitch and length as necessary to follow roof pitch. At roof, cap panels with C-runner and fasten to framing with aluminum clips.
- E Sound Attenuation Fire Blankets**—When specified, install blankets with joints staggered. For direct attachment to 1" liner panels, attach blankets with seven ¾" staples randomly driven through each blanket. Blanket installation within cavities is friction fit between stud framing.
- F Interior Finish**—Apply specified gypsum panels to wood studs and joists with screws or nails in conventional manner.

3.2 Cavity Wall

- A Foundation**—Position 2½" wide steel C-runner at floor and securely attach to foundation with power-driven fasteners at both ends and spaced 24" o.c. Caulk runner at foundation with ¼" bead of SHEETROCK Acoustical Sealant.
- B First Floor**—Install 1" liner panels and steel studs cut to a convenient length more than floor-to-floor height. Erect liner panels vertically in C-runner with long edges in groove of C-H stud. Install C-H studs between panels and cap ends of run with E-stud or C-runner. Fasten cap end flanges to C-runners with ¾" Type S screws both sides.
- C Intermediate Floors**—Cap top of panels and studs with C-runner and fasten studs to C-runner flanges on alternate sides with ¾" Type S screws. Install bottom C-runner for next row of panels over top runner with end joints staggered at least 12". Fasten runners together with double ¾" screws at ends and spaced 24" o.c. Secure each stud to framing with 0.063" aluminum angle clip, fastened to both sides of each stud with ¾" screws and to framing or subfloor with 1½" Type W screws.
- D Roof**—Continue erecting studs and panels for succeeding stories as previously described. At roof, cap panels with C-runner and fasten studs to flanges with ¾" screws. Fasten studs to framing with aluminum clips.
- E Sound Attenuation Fire Blankets**—When specified, install blankets between studs and attach to liner panel with five ¾" staples driven through each blanket, one in center and others spaced 3" from each corner. Butt blankets closely and fill all voids.
- F Resilient Channels**—When specified, install RC-1 Resilient Channels horizontally to face side of studs, 6" above floor, 6"

below ceiling joists and max. 24" o.c. Attach channels to studs with ¾" Type S screws driven through holes in mounting flange. Extend channels to ends of runs and attach to E-studs or C-runners. Splice channel by nesting directly over stud; screw-attach through both flanges. Reinforce with screws at both ends of splice.

- G Gypsum Panels**—Apply ½" SHEETROCK brand Gypsum Panels, Water-Resistant, FIRECODE C Core, vertically to both sides of studs. Stagger joints on opposite partition sides. Fasten panels with 1" Type S screws spaced 12" o.c. in field and along edges and runner flanges.
- H Resilient Single-layer**—Apply ½" gypsum panels vertically to resilient channels and fasten with 1½" Type S screws placed 6" from stud and 12" o.c. Do not place screws directly over stud.
- I Resilient Double-layer**—Apply ¾" gypsum panel base layer perpendicular to resilient channels with joints staggered; fasten with 1½" Type S screws placed 6" away from stud and 12" o.c. Apply ¾" gypsum panel face layer vertically over base layer with edge joints staggered and attach with 1½" Type S screws spaced 12" o.c. and staggered from those in base layer.

3.3 Accessory Application

- A Joint System**—Finish all face panel joints and internal angles with a United States Gypsum Company Joint System installed according to manufacturer's directions. Spot exposed fasteners on face layers and finish corner bead, control joints and trim as required, with at least three coats of joint compound, feathered out onto panel faces and sanded smooth.
- B Metal Trim**—Where partition or ceiling terminates against masonry or other dissimilar material, apply metal trim over drywall edge; fasten with nails or galvanized staples 9" o.c.
- C Screws**—Power-drive at least ¾" from edges or ends of gypsum panels to provide uniform dimple ½" deep.
- D Control Joints**—Break gypsum panels and resilient channels behind joint and back by double supports. Attach control joint to face layer with nails or ¾" galvanized staples spaced 6" o.c. on both flanges along entire length of joint.

Product Information and Literature: 1-800-USG-4YOU (1-800-874-4968).

Sales Offices: **Arizona:** Phoenix, (602) 866-0795 • **California:** Fremont, (510) 792-4400, Glendale, (818) 956-1882 • **Florida:** Jacksonville, (904) 764-3293, Miami, (305) 557-4501 • **Georgia:** Atlanta, (404) 393-0770 • **Hawaii:** Honolulu, (808) 591-8815 • **Illinois:** Chicago, (312) 606-5488 • **Indiana:** Indianapolis, (317) 848-1513 • **Louisiana:** New Orleans, (504) 241-2020 • **Maryland:** Baltimore, (410) 355-2200 • **Massachusetts:** Charlestown, (617) 241-8530 • **Michigan:** Southfield, (313) 569-1900 • **Minnesota:** Bloomington, (612) 854-4233 • **Missouri:** St. Louis, (314) 349-0980 • **New York:** Albany, (518) 458-7437, Stony Point, (914) 786-2820 • **North Carolina:** Charlotte, (704) 552-7402 • **Ohio:** Cleveland, (216) 899-7333 • **Oregon:** Beaverton, (503) 626-8864 • **Pennsylvania:** Philadelphia, (410) 355-2200, Pittsburgh, (800) 289-4874 • **Tennessee:** Nashville, (615) 361-8419 • **Texas:** Dallas, (214) 490-0771, Houston, (713) 868-9937 • **Utah:** Salt Lake City, (801) 266-4975 • **Virginia:** Richmond, (804) 285-7528 • **International Division:** Chicago, (312) 606-5840.

Trademarks: The following trademarks used herein are owned by United States Gypsum Company or a related company: USG, SHEETROCK, FIRECODE, THERMAFIBER, RC-1.

Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

Notice: We shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Our liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered.

Metric Specifications: USG Corporation, through its operating subsidiaries, will provide metric conversions on its products and systems to help specifiers match metric design sizes. In addition, some products are available in metric dimensions from selected manufacturing plants. Refer to SA-100 Construction Selector for additional information and a Table of Metric Equivalents.

United States Gypsum Company

125 South Franklin Street
P.O. Box 806278
Chicago, Illinois 60680-4124
A Subsidiary of USG Corporation

SA-925/1-94 Printed in U.S.A.

USG Cavity Shaft Wall Systems

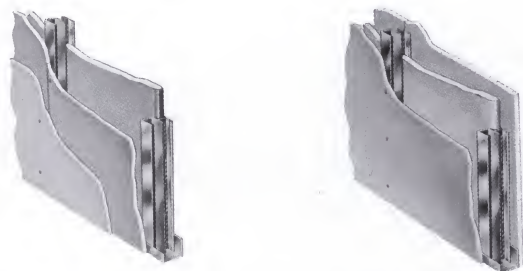


For vertical and horizontal shaft enclosures—stairwell,
elevator, mechanical and air duct—in multi-story buildings

USG

Fire-Resistant Drywall Partitions for Enclosing Shafts in Multi-Story Buildings

2-hour assemblies



Double layer one side

Single layer both sides

Description

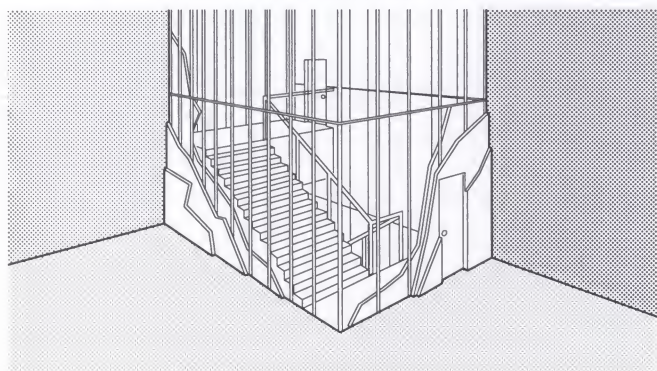
USG Cavity Shaft Walls offer high performance characteristics and greater economy than other shaft walls. Engineered design of the C-H stud system provides a thin, lightweight assembly that offers fast installation and low material costs, producing low in-place costs as well as savings in structural steel. In addition, USG Shaft Walls provide up to 4-hour fire resistance and sound ratings to 51 STC. They resist intermittent lateral loads up to 15 psf; also resist fatigue failure under cyclic lateral loading.

USG Cavity Shaft Walls are non-load bearing gypsum board partition assemblies designed for erection from outside the shaft at each floor. Shafts are enclosed early in construction, the walls finished later along with interior partitions. This fast-installation feature combined with low-cost materials and high performance values makes USG Cavity Shaft Walls superior enclosures for elevator and mechanical shafts, air ducts and stairwells in multi-story buildings.

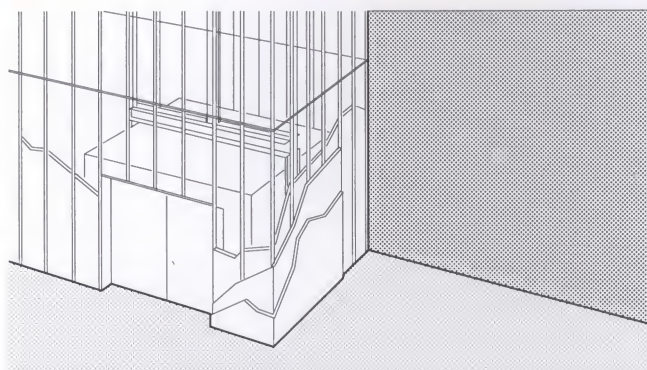
USG Cavity Shaft Walls are covered by three model building codes under NER 258. In addition to a 1½" deep x 22½" wide vertical chaseway, the C-H Stud used has 1" dia. holes 16" from each end for horizontal conduit runs. A 3" deep chase to carry electrical elevator controls is available with the 4" C-H Stud and a 5" chase for 6" studs.

The assemblies are simply constructed of SHEETROCK brand Gypsum Panels, FIRECODE C Core, or IMPERIAL FIRECODE C Gypsum Base and veneer finish, steel studs and runners, and SHEETROCK brand Gypsum Liner Panels.

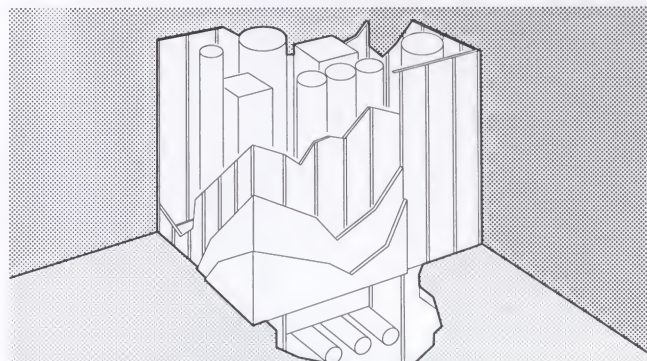
SHEETROCK brand Gypsum Liner Panels are installed vertically between USG Steel J-Runners attached to floor and ceiling. Panel edges are inserted into specially formed USG Steel C-H Studs spaced 24" o.c. The 2-hour shaft wall is completed with double-layer ½" thick gypsum panels and a United States Gypsum Company joint



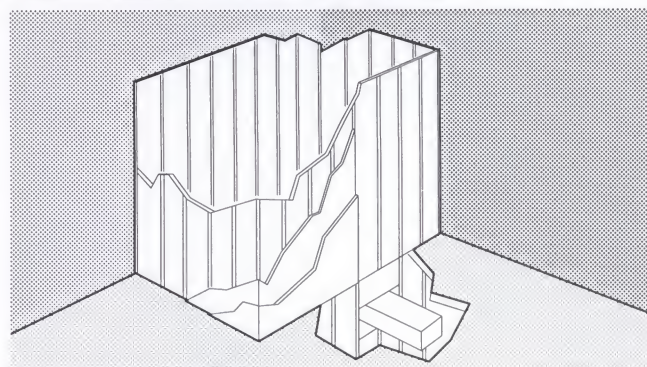
Stairwells



Elevator shafts



Mechanical shafts (HVAC, plumbing, electrical, etc.)



Air return shafts (unlined)

system, or with gypsum base and veneer finish applied to one side. Where both sides of the wall must be finished, single-layer panels are applied to each side of studs. A 1-hour assembly is obtained with single-layer ¾" thick face panels. Additional layers of panels are installed in 3 and 4-hour fire-rated construction (see details, page 3).

Liner panels have a special fire-resistant core and multi-layered green paper facings that are treated to resist moisture penetration. The panels are 1" thick, 24" wide and have beveled edges. SHEETROCK brand Gypsum Panels, FIRECODE C Core, for these systems are ½" or ¾" thick and 4' wide. IMPERIAL FIRECODE C Gypsum Base, ½" or ¾" thick and 4' wide, has a high-strength, high-density core covered with special-absorption face paper for a veneer finish. USG Steel J-Runners, C-H Studs and E-Studs are formed from hot-dipped galvanized steel.

Twelve Reasons to Choose USG Cavity Shaft Wall

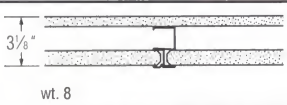
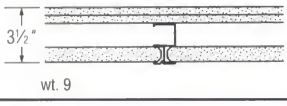
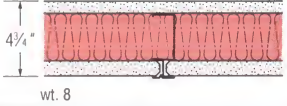
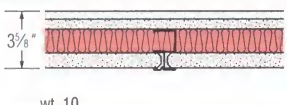
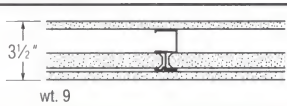
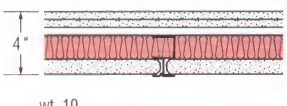
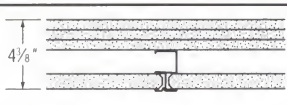
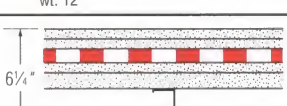
- 1 The basic system is UL classified—UL Designs U438, U459, U467 and U469—and is the *only* shaft system that is so classified.
- 2 National Evaluation Report (NER-258) assures acceptance by all three model code bodies—BOCA, ICBO, SBCCI.
- 3 All major elevator door manufacturers have tested their doors at UL in USG Cavity Shaft Wall.

Test Data

THERMAFIBER Insulation*

Furring channels

RC-1™ Resilient Channels

Fire rating	Fire-rated construction Detail & physical data	Description & test no.	Acoustical performance		System reference
			STC	Description & test no.	
1 hr.	 wt. 8	Cavity Shaft Wall Gypsum Drywall— $\frac{5}{8}$ " SHEETROCK brand gypsum panels, FIRECODE C core, one side—1" SHEETROCK brand gypsum liner panels set betw USG steel C-H studs 24" o.c.—panels appl to side opp liner panels & screw att—joints fin—fire rating also applies with IMPERIAL FIRECODE C base and veneer finish surface— UL Des U469	N/A		A
2 hr.	 wt. 9	Cavity Shaft Wall Gypsum Drywall—2 layers $\frac{5}{8}$ " SHEETROCK brand gypsum panels, FIRECODE C core, one side—1" SHEETROCK brand liner panels set betw USG steel 25-ga. C-H studs 24" o.c.—panels appl vert to side opp liner panels & screw att—joints fin—rating also applies with IMPERIAL FIRECODE C base and veneer finish surface or THERMAFIBER in cavity—fire-tested both sides— UL Des U438	39 47	USG-750302 Based on 1" THERMAFIBER SAFB— BBN-750706	B
2 hr.	 wt. 8	Cavity Shaft Wall—1" SHEETROCK brand gypsum liner panels, set betw 4" USG steel C-H studs 24" o.c. one side— $\frac{3}{4}$ " SHEETROCK brand gypsum panels, ULTRACODE core, other side—3" THERMAFIBER SAFB—panels vert appl & screw att 8" o.c. perim, 12" o.c. field—joints stag & fin—perimeter caulked— UL Des U492	52	SA-910913	C
2 hr.	 wt. 10	Cavity Shaft Wall Cement Board/Gypsum Drywall— $\frac{1}{2}$ " DUROCK cement board— $\frac{3}{4}$ " SHEETROCK brand gypsum panels, FIRECODE core—1" SHEETROCK brand gypsum liner panels set betw USG steel 20 ga. min C-H studs 24" o.c.— $\frac{1}{8}$ " THERMAFIBER SAFB—cement board screw att with $\frac{1}{8}$ " DUROCK steel screws & laminated to gypsum panel with 4" strip DURABOND ceramic tile mastic applied with $\frac{3}{8}$ " notched trowel midway betw studs—joints fin— UL Des U459**	N/A	N/A	D
2 hr.	 wt. 9	Cavity Shaft Wall Gypsum Drywall— $\frac{5}{8}$ " SHEETROCK brand gypsum panels, FIRECODE C core—1" SHEETROCK brand gypsum liner panels set betw USG steel C-H studs 24" o.c.—single layer panels ea side appl vert & screw att—joints stag on opp sides & fin—rating also applies with IMPERIAL FIRECODE C base and veneer finish surface—fire-tested both sides— UL Des U467	N/A		E
2 hr. est	 wt. 10	Cavity Shaft Wall Gypsum Drywall—2 layers $\frac{5}{8}$ " SHEETROCK brand gypsum panels, FIRECODE C core, one side—1" SHEETROCK brand gypsum liner panels set betw USG 25-ga. steel C-H studs 24" o.c.—RC-1 chan spaced 24" o.c.— $\frac{1}{8}$ " THERMAFIBER SAFB—panels & RC-1 chan screw att to side opp liner panels—base layer appl horiz—face layer appl vert—joints fin—est. fire rating based on U of C 2-8-72 and U of C 6-23-75—rating also applies with IMPERIAL FIRECODE C base and veneer finish	51	BBN-750412	F
3 hr. est	 wt. 12	Cavity Shaft Wall Gypsum Drywall—3 layers $\frac{5}{8}$ " SHEETROCK brand gypsum panels, FIRECODE C core, one side—1" SHEETROCK brand gypsum liner panels set betw USG steel C-H studs 24" o.c.—panels screw att to side opp liner panels with joints stag—base & face layers appl vert—mid layer apply horiz—joints fin—est. fire rating based on U of C 2-16-72—rating also applies with IMPERIAL FIRECODE C base and veneer finish surface	N/A		G
4 hr. est	 wt. 16	Cavity Shaft Wall Gypsum Drywall—2 layers $\frac{5}{8}$ " SHEETROCK brand gypsum panels, FIRECODE C core, face side—1" SHEETROCK brand gypsum liner panels set betw USG steel C-H studs 24" o.c.—1" liner panels & $\frac{3}{8}$ " gypsum panel core screw att to studs—horiz met fur chan 24" o.c.—face side panels screw att to fur chan—panels appl vert with joints stag—joints fin—est. fire rating based on U of C 5-24-74—rating also applies with IMPERIAL FIRECODE C base and veneer finish surface	N/A		H

*Where thermal insulation is shown in assembly drawing, the specific product is required in the assembly to achieve the stated fire rating. Fiberglass insulation can not be substituted for THERMAFIBER Insulation.

**Use L/360 deflection criteria for limiting height/stud selection. Refer to SA-932 DUROCK Cement Board Systems for more information on cement board and related products.

- 4 ASTM E152 standard test for door frames doesn't allow substitution—the door frame must be installed in the wall in which it was tested.
- 5 Fire-tested penetration details for call boxes and position indicators.
- 6 USG Steel C-H Stud offers continuous edge support of liner panel for airtight, smoke-tight, rattle-free performance.
- 7 USG Steel C-H Stud has no tabs to bend, break, cut installer's hands or delay the job.
- 8 USG Steel C-H Stud blank width is wider and contains 21% more steel than some competitive tabbed stud blanks, making it stronger and more resistant to fatigue.
- 9 Most comprehensive limiting height information allows for safer design practices.
- 10 Pressure tested to one million cycles proves system longevity.
- 11 Only wall for which a UL smoke and fire damper test is available.
- 12 More than 20 years of proven performance.

Engineered Performance to Meet Design and Fire Protection Requirements

Walls that enclose elevator shafts, stairwells and other vertical shafts are the most important walls in a building from a life-safety standpoint. Should a fire occur, firemen control the use of elevators; the stairwells provide the only means for human egress within the building. Since these walls contain the life-lines of the building, they

must be structurally strong to withstand lateral loads and provide needed fire protection.

USG Cavity Shaft Wall Systems have been designed and tested using accepted engineering practices with deflection criteria of L/120, L/240, and L/360 clear partition heights. Additionally, limiting height tables listed herein account for flexural and shear forces. A wide range of product and installation combinations is available to meet performance requirements: intermittent air pressure loading of 5, 7½, 10, 15 psf; vertical heights in three stud sizes and four steel thicknesses to accommodate lobbies and mechanical rooms (see Limiting Height Table, page 5). A 2-hr. fire-resistant rating, a common building code requirement, is met with USG Cavity Shaft Walls—UL Design No. U438 and U467. A 2-hr. fire-resistant assembly using one layer of SHEETROCK brand Gypsum Panels, ULTRACODE Core, is available—UL Design No. U492. Also, a 2-hr. fire-resistant assembly using DUROCK Cement Board on the finish side is available—UL Design U459. Up to 4-hour fire-resistance ratings and excellent sound control are offered with modified assemblies (see test data, page 3). Surface burning characteristics for 1" SHEETROCK brand Gypsum Liner Panels are flame spread 20, smoke developed 0.

Faster Completion—Earlier Occupancy

USG Cavity Shaft Walls erect easily using components and application procedures familiar to mechanics. Cavity Shaft Walls,

because they are erected without adhesives, install faster than other multi-layer gypsum panel systems. All USG Cavity Shaft Wall Systems install from each floor, leaving shaft free of scaffolding. Elevators go in early—ready to move men and materials to floors when they are needed. Jobs move faster, schedules are more easily met and buildings can be occupied sooner.

Economy

USG Cavity Shaft Walls utilize low-cost materials and a minimum number of components. The assemblies are lightweight, ranging from the exceptionally low 9 psf for 2-hour systems to 16 psf for the 4-hour assembly. In high-rise buildings, USG Cavity Shaft Walls offer an opportunity for significant savings in structural framing costs.

Sound Control

The standard Cavity Shaft Wall assembly offers 39 STC rating; 47 STC can be obtained by adding 1" THERMAFIBER Sound Attenuation Fire Blankets (SAFB) within the partition cavity and 51 STC with RC-1 Resilient Channels (part of the family of SHEETROCK Metal Products) and 1½" THERMAFIBER SAFB.

Provide Airtight Seal

With SHEETROCK Acoustical Sealant applied to partition perimeter and penetrations, the assemblies resist air pressure surges up to 15 psf (see details). This minimizes whistling and dirt accumulation due to air movement in elevator shafts.

Strong, Rigid Studs

Engineering design has developed the unique C-H Stud, a strong, rigid and highly efficient structural member. The stud flanges provide friction-fit contact along the entire liner panel length to eliminate rattles. When used with J-Runners and gypsum liner panels, the C-H Stud produces a stronger, sturdier wall permitting greater limiting heights compared to competitive systems.

Impact-Resistant

USG Cavity Shaft Walls subjected to impact proved to be rugged and durable. Wall was impacted with a 60-lb. sand bag. In the test, three impacts each were made at 15 ft.-lb., 30 ft.-lb., and each following 15 ft.-lb. interval until failure. At 270 ft.-lb. the test was stopped; while cracked, the wall was not penetrated, thus showing remarkable toughness.

Flexing Resistance Provides Life-Safety

Shaft walls are "working walls." They are subjected to both positive and negative pressures as elevator cabs rise and descend. This piston-effect of elevators in a shaft causes continual flexing in the shaft wall. In tests, USG Cavity Shaft Walls were subjected to over one million full oscillation cycles to check wall performance through the life of the building. These tests showed that a 25-ga. J-Runner is inadequate at the top or bottom of a shaft wall. As the long runner leg is continually flexed from wall deflection, it can rupture and screws strip out and fracture from the flexing. Oscillation tests showed 24-ga. runners minimize these problems and are essential to safety over a long time period.

Limitations

- 1 Non-load bearing.
- 2 Elevator door operating equipment must be independently mounted.
- 3 Exposure to excessive or continuous moisture and temperatures exceeding 125°F (52°C) must be avoided.

Elevator Shaft Pressures

The air pressure load on shaft walls depends upon the elevator cab speed and the number of elevators per shaft. The following recommendations are derived from United States Gypsum Company tests conducted in three high-rise buildings up to 17 stories.

Recommended Elevator Shaft Pressure Load

Elevator velocity ft./min.	One or two elevators per shaft	Three or more elevators per shaft
0 to 180	5.0 psf	5.0 psf
180 to 1,000	7.5 psf	5.0 psf
1,000 to 1,800	10.0 psf	7.5 psf
1,800 to 3,000	15.0 psf	7.5 psf

Limiting Heights

Maximum partition heights are shown for four different intermittent air pressure loads and three allowable deflections. The applied pressure load is selected by the designer based on elevator cab speed and the number of elevators per shaft. Instead of using only deflection criteria, United States Gypsum Company design data considers several additional factors in determining limiting partition heights.

- Bending stress**—the unit force exerted which will break or distort the stud.
- End reaction shear**—determined by the amount of force applied to the stud which will bend or shear the J-Runner or cripple the stud.
- Deflection**—the actual deflection under a load. Allowable deflection is based on the amount of bending under load that a particular wall can experience and still perform its function with safety.

Thickness—Steel Components⁽¹⁾

Style	Design ⁽²⁾		Minimum	
	in	mm	in	mm
CH, ES 25	0.0188	0.48	0.0179	0.45
JR 24	0.0239	0.61	0.0227	0.58
CH 22	0.0310	0.79	0.0294	0.75
ES, JR, JS, CH 20	0.0359	0.91	0.0341	0.87

(1) Uncoated steel thickness; meets ASTM A568. Studs and runners meet ASTM C645. Base metal meets ASTM A446 standards for structural performance. Coatings are galvanized per ASTM A525; aluminumized per ASTM A463, or aluminum-zinc per ASTM A792. (2) Conforms to AISI Specification for the Design of Cold-Formed Steel Structural Members, 1986 edition.

Structural Properties—Steel Components

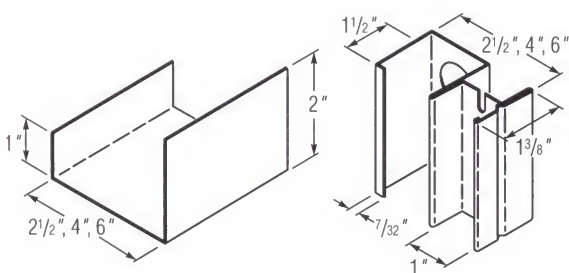
Component & size	Stud designation	Avg. weight (lb/lin ft)	Area (in ²)	I _x (in ⁴)	S _x * (in ³)	Allow. design stress (ksi)
2½" C-H stud	212CH25	0.5186	0.1524	0.129	0.093	19.8
	212CH22	0.861	—	0.208	0.1519	24.0
	212CH20	0.998	—	0.239	0.1741	24.0
4" C-H stud	400CH25	0.6118	0.1798	0.383	0.162	19.8
	400CH20	1.243	—	0.730	0.318	24.0
6" C-H stud	600CH20	1.366	0.4227	1.998	0.569	24.0
double 6" E-Stud	600ES25	1.546	0.3982	2.004	0.628	20.00
	600ES20	2.372	0.0840	3.400	1.094	20.00
2½" J-Runner	212JR24	0.448	—	0.117	0.085	3.00
	212JR20	0.670	—	0.192	0.130	4.96
4" J-Runner	400JR24	0.573	—	0.351	0.163	3.00
	400JR20	0.857	—	0.574	0.251	4.96
6" J-Runner	600JR24	0.740	—	0.937	0.295	3.00
	600JR20	1.107	—	1.523	0.457	4.96
2½" Jamb Strut	212JS20	0.818	—	0.226	0.143	3.00
4" Jamb Strut	400JS20	1.006	—	0.647	0.270	3.00
6" Jamb Strut	600JS20	1.256	—	1.673	0.485	3.00

*Full section modulus to be used with corresponding design stress. For wind loads, design stress shown can be increased 33%.

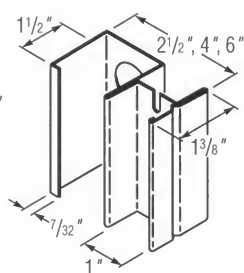
Limiting Heights⁽¹⁾—Shaft Walls

Stud type & size	Designation	Allow. defl.	Intermittent air pressure load (wind load)—psf											
			Fire-rated system B, D, F, G, H				Fire rated system E ⁽²⁾				Fire rated system C			
			5	7.5	10	15	5	7.5	10	15	5	7.5	10	15
2 1/2" C-H Studs	212CH25	L/120	12'10"(f)	10'5"(f)	9'0"(f)	7'5"(f)	12'10"(f)	10'5"(f)	9'0"(f)*	7'5"(f)	—	—	—	—
		L/240	12'1"(d)	10'5"(f)	9'0"(f)	7'5"(f)	11'8"(d)	10'2"(d)	9'0"(d)	7'5"(f)	—	—	—	—
		L/360	10'7"(d)	9'3"(d)	8'5"(d)	7'4"(d)	10'2"(d)	8'11"(d)	8'0"(d)	7'1"(d)	—	—	—	—
	212CH22	L/120	18'0"(f)	14'8"(f)	12'9"(f)	10'5"(f)	17'2"(d)	14'8"(f)	12'9"(f)	10'5"(f)	—	—	—	—
		L/240	14'11"(d)	13'0"(d)	11'10"(d)	10'4"(d)	13'7"(d)	11'11"(d)	10'10"(d)	9'5"(d)	—	—	—	—
		L/360	13'0"(d)	11'5"(d)	10'4"(d)	9'0"(d)	11'11"(d)	10'5"(d)	9'5"(d)	8'3"(d)	—	—	—	—
	212CH20	L/120	19'2"(d)	15'9"(f)	13'8"(f)	11'2"(f)	17'7"(d)	15'4"(d)	13'8"(f)	11'2"(f)	—	—	—	—
		L/240	15'3"(d)	13'4"(d)	12'1"(d)	10'7"(d)	14'0"(d)	12'2"(d)	11'1"(d)	9'8"(d)	—	—	—	—
		L/360	13'4"(d)	11'7"(d)	10'7"(d)	9'3"(d)	12'2"(d)	10'8"(d)	9'8"(d)	8'6"(d)	—	—	—	—
4" C-H Studs	400CH25	L/120	16'11"(f)	11'11"(f)	11'11"(f)	9'8"(v)*	16'10"(f)	13'9"(f)	10'4"(v)*	6'11"(v)*	16'10"(f)	13'9"(f)	10'4"(v)*	6'11"(v)*
		L/240	16'11"(f)	13'10"(f)	11'11"(f)	9'8"(v)*	16'3"(d)	13'9"(f)	10'4"(v)*	6'11"(v)*	15'10"(d)	13'4"(d)	10'4"(v)*	6'11"(v)*
		L/360	14'3"(d)	12'5"(d)	11'11"(f)	9'8"(v)*	14'3"(d)	12'5"(d)	10'4"(v)	6'11"(v)*	13'4"(d)	11'8"(d)	10'4"(v)*	6'11"(v)*
	400CH20	L/120	22'10"(d)	20'0"(d)	18'2"(d)	15'0"(f)*	23'7"(d)	20'7"(d)	18'5"(f)	15'0"(f)*	22'0"(d)	19'3"(d)	17'6"(d)	15'0"(f)*
		L/240	18'2"(d)	15'10"(d)	14'5"(d)	12'7"(d)	18'9"(d)	16'4"(d)	14'10"(d)	13'0"(d)	17'6"(d)	15'3"(d)	13'11"(d)	12'2"(d)*
		L/360	15'10"(d)	13'10"(d)	12'7"(d)	11'0"(d)	16'4"(d)	14'3"(d)	13'0"(d)	11'4"(d)	15'3"(d)	13'4"(d)	12'2"(d)	10'7"(d)*
6" C-H Studs	600CH20	L/120	28'0"(c)	27'7"(d)	24'8"(f)*	18'0"(v)*	28'0"(c)	26'5"(d)*	24'0"(d)*	18'0"(v)*	28'0"(c)	26'8"(d)*	20'2"(v)*	13'6"(v)*
		L/240	25'1"(d)	21'11"(d)	19'11"(d)	17'5"(d)*	24'0"(d)	20'11"(d)*	19'0"(d)	16'8"(d)*	24'3"(d)	21'2"(d)*	19'3"(d)*	13'6"(v)*
		L/360	21'11"(d)	19'2"(d)	17'5"(d)	15'2"(d)	20'11"(d)	18'4"(d)	16'8"(d)	14'6"(d)	21'2"(d)	18'6"(d)	16'9"(d)*	13'6"(v)*
Double 6" E-Studs	600ES25	L/120	28'0"(v)	18'9"(v)	14'0"(v)	9'3"(v)	28'0"(v)	18'9"(v)	14'0"(v)	9'3"(v)	28'0"(v)	18'9"(v)	14'0"(v)	9'3"(v)
		L/240	26'3"(d)	18'9"(v)	14'0"(v)	9'3"(v)	25'6"(d)	18'9"(v)	14'0"(v)	9'3"(v)	25'3"(d)	18'9"(v)	14'0"(v)	9'3"(v)
		L/360	23'0"(d)	18'9"(v)	14'0"(v)	9'3"(v)	22'3"(d)	18'9"(v)	14'0"(v)	9'3"(v)	22'0"(d)	18'9"(v)	14'0"(v)	9'3"(v)
	600ES20	L/120	28'0"(c)	28'0"(c)*	28'0"(c)*	20'0"(v)*	28'0"(c)	28'0"(c)	28'0"(c)*	20'0"(v)*	28'0"(c)	28'0"(c)*	28'0"(c)*	20'0"(v)*
		L/240	28'0"(c)	26'3"(d)*	24'0"(d)*	20'0"(v)*	28'0"(c)	26'0"(d)*	23'6"(d)*	20'0"(v)*	28'0"(c)	24'9"(d)	22'6"(d)*	20'0"(v)*
		L/360	26'3"(d)	23'0"(d)	21'0"(d)*	18'3"(d)*	26'3"(d)	22'9"(d)	20'6"(d)*	18'0"(d)*	25'3"(d)	21'9"(d)	19'6"(d)	17'3"(d)*

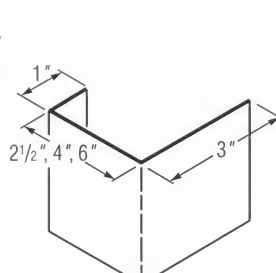
(1) Stud spacing of 24" for all values. Table heights also apply to sustained pressures (max. 10 psf) equal to 1/2 of intermittent pressures shown. (2) For assembly with single-layer board both sides of studs. (3) For assembly with single-layer board attached to studs. Limiting criteria: f—bending stress, d—deflection, v—end reaction shear, c—practical limitation. **IMPORTANT:** Runner fasteners should withstand 193 lb. single shear and 200 lb. bearing force; attachment spacing should not exceed 24" o.c. *Use JR20 runner for heights with asterisk. See page 3 for system references and rated assembly details. **NOTE:** L/180 data available upon request from U.S. Gypsum Company.



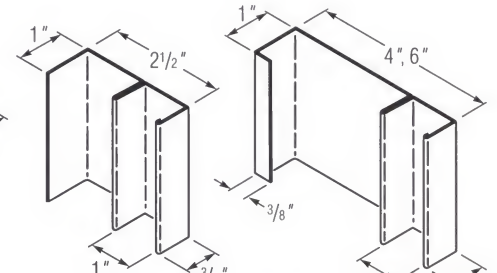
USG Steel J-Runner (JR)



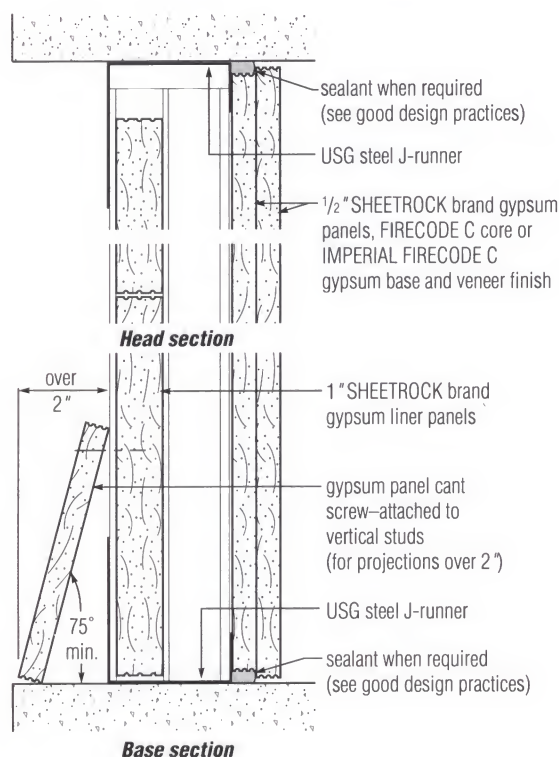
USG Steel C-H Stud (CH)



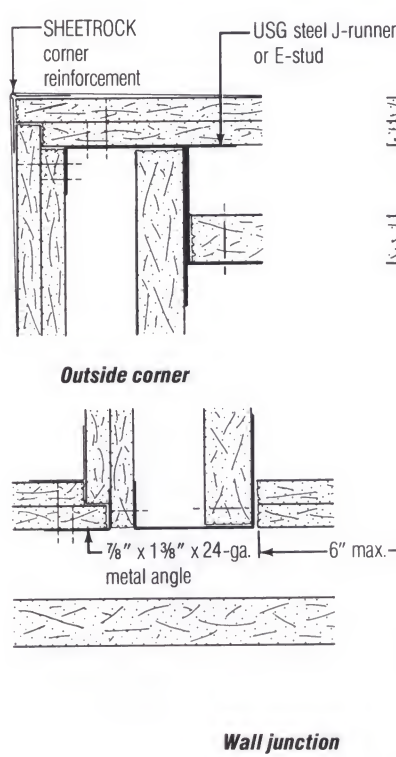
Steel Jamb-Strut



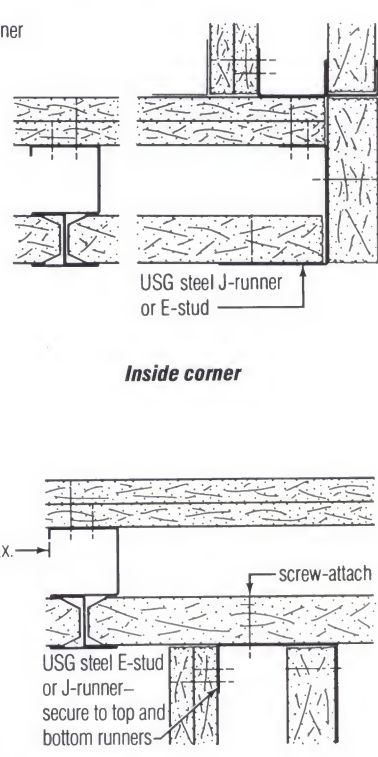
USG Steel E-Stud (ES)



Base section

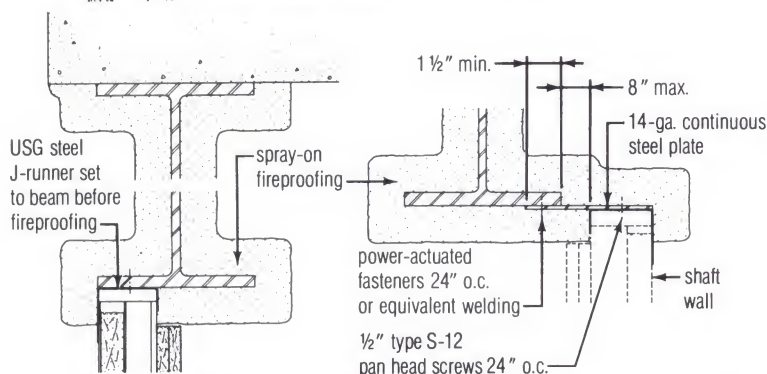
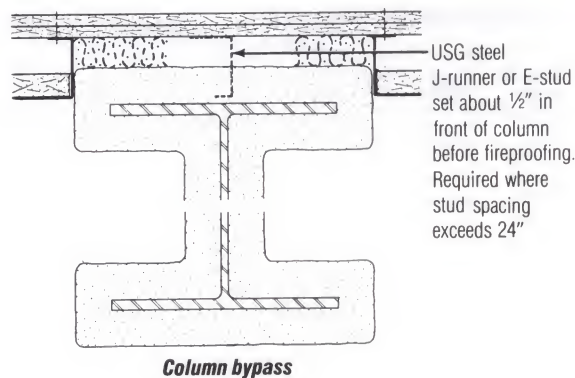
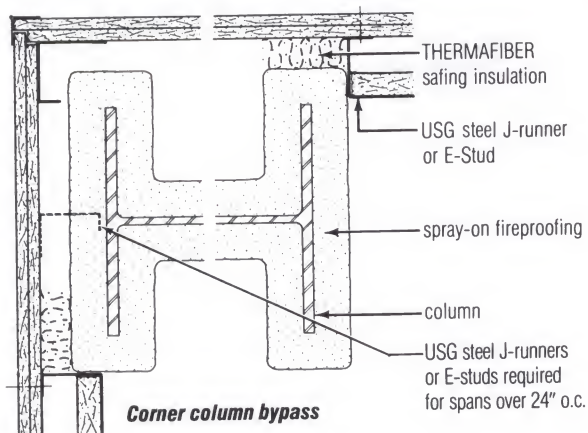


Outside corner



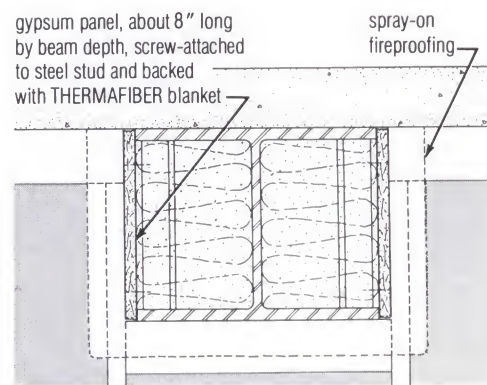
Inside corner

Wall junction

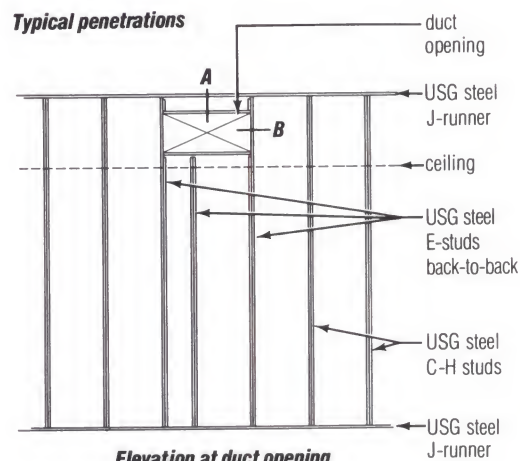


**Steel beam
(2-hr. beam/
2-hr. partition—
see specifications)**

**Steel beam
offset wall**



Elevation at boxed beam



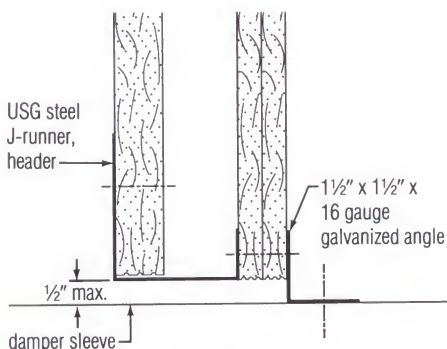
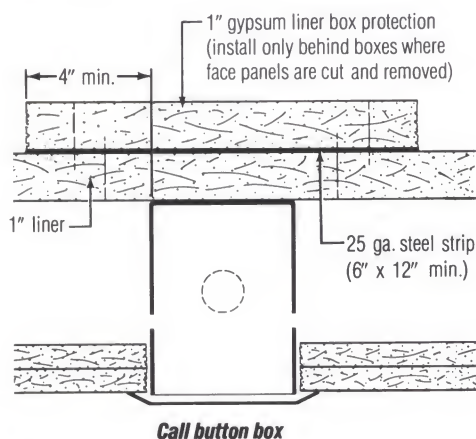
Elevation at duct opening

Penetration Fire Tests

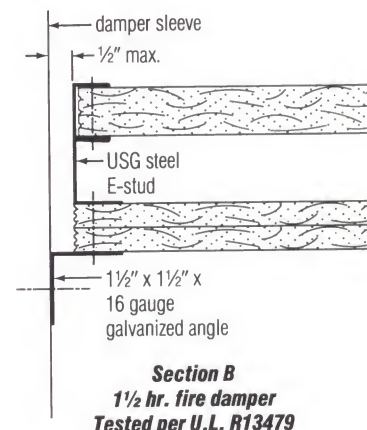
To maintain the integrity of the shaft wall, most services that interrupt the wall must have additional protection against fire. Call-button and floor-indicator penetrations occur in every elevator shaft wall. Boxes for these services usually penetrate the wall and invalidate the fire rating unless supplementary fire protection is added. Details included here successfully achieved a 2-hour fire endurance when tested according to ASTM E119 fire exposure.

Electrical Box: Box size should be compatible with C-H stud size selected (4" studs typically required) per Test CEG 6-15-79.

Fire Damper: 1 1/2 hour per Test UL R13479.

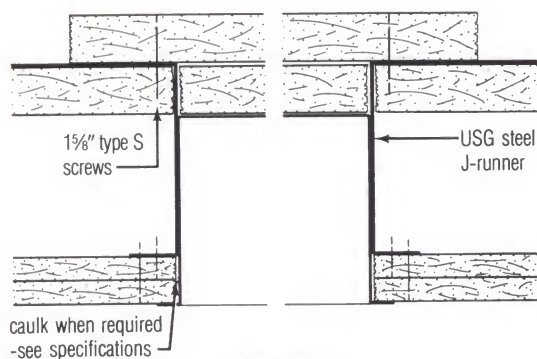
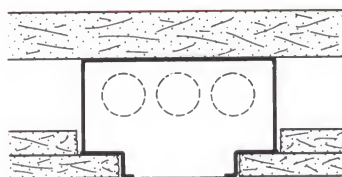
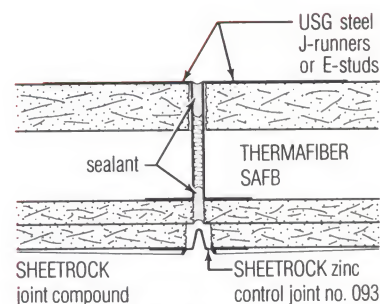
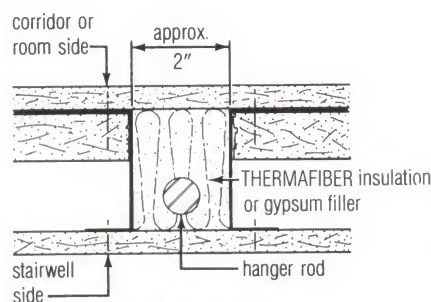
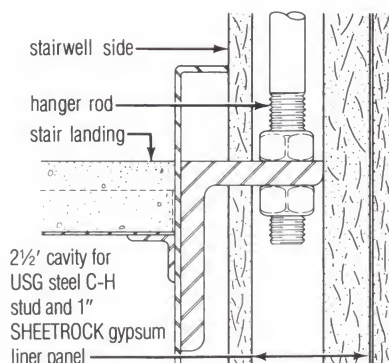
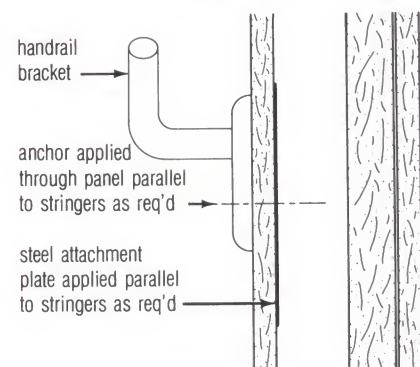


**Section A
1 1/2 hr. fire damper
Tested per U.L. R13479**



**Section B
1 1/2 hr. fire damper
Tested per U.L. R13479**

scale: 3" = 1'-0"

**Mail chute****Outlet box****Control joint****Cross section at stair hanger****Stair hanger rod application****Handrail application**

Air Handling Systems

Gypsum shaft walls have been used for many years to house all types of ducts in the shaft area. Their fire-resistant features plus economical dry construction make them ideal for this use. Today shaft walls are used successfully without a metal liner for handling return air in HVAC systems. To function properly, shaft wall systems should be designed with the following performance provisions.

- 1 Gypsum board surface temperature does not exceed 125°F.
- 2 Air stream dew point temperatures are maintained below gypsum board surface temperature.
- 3 The assembly is constructed to withstand sustained design uniform air pressure loads not exceeding 10 psf. Start up surge loads should not be greater than 1 1/2 times the design static load. (See table at right for limiting heights).
- 4 Separate approved liners should be installed in areas subject to continuous moisture overspray, condensation or air stream temperature over 125°F.
- 5 To insure airtight construction, select appropriate sealants and apply where required.

Limiting Heights—Unlined Return Air Shafts

Stud type & size	Designation	Stud spcg.	Allow. defl.	Sustained pressure load—psf			
				2-hr. fire-rated system		1-hr. fire rated system	
				5	10	5	10
2 1/2" C-H Studs	212CH25	24"	L/120	10'5"	7'5"	10'5"	6'0"
			L/240	10'5"	7'5"	8'6"	6'0"
			L/360	9'3"	7'5"	7'5"	5'11"
	212CH22	24"	L/120	14'8"	10'5"	14'8"	10'5"
			L/240	13'0"	10'4"	11'11"	9'5"
			L/360	11'5"	9'0"	10'5"	8'3"
4" C-H Studs	212CH20	24"	L/120	15'9"	11'2"	15'4"	11'2"
			L/240	13'4"	10'7"	12'2"	9'8"
			L/360	11'7"	9'3"	10'8"	8'3"
	400CH25	24"	L/120	13'10"	9'8"	13'9"	6'11"
			L/240	13'10"	9'8"	13'4"	6'11"
			L/360	12'5"	9'8"	11'8"	6'11"
6" C-H Studs	400CH20	24"	L/120	20'0"	15'0"	19'3"	15'0"
			L/240	15'10"	12'7"	15'3"	12'2"
			L/360	13'10"	11'0"	13'4"	10'7"
	600CH20	24"	L/120	27'7"	18'0"	26'8"	13'6"
			L/240	21'11"	17'5"	21'2"	13'6"
			L/360	19'2"	15'2"	18'6"	13'6"
Double 6" E-Studs	600ES25	24"	L/120	18'9"	9'3"	18'9"	9'3"
			L/240	18'9"	9'3"	18'9"	9'3"
			L/360	18'9"	9'3"	18'9"	9'3"
	600ES20	24"	L/120	28'0"	20'0"	28'0"	20'0"
			L/240	26'3"	20'0"	24'9"	20'0"
			L/360	23'0"	18'3"	21'9"	17'3"

Important: Runner fasteners should withstand 193 lb. single shear and 200 lb. bearing force; attachment spacing should not exceed 24" o.c.

* Use JR20 runner for heights with asterisk.

Elevator Door and Frame Assemblies

Typically, for buildings of four stories or more, building codes require a 1½-hour “B” rating for elevator entranceways in a 2-hour-rated shaft wall. Certain firms have conducted fire tests with their door and frame assemblies in USG Cavity Shaft Walls—UL Design U438 rated 2-hours. These door assemblies comply with the safety code for elevators and dumbwaiters ANSI A17.1 and have been tested per ASTM E152. Specific door jamb studs, jamb struts and installation methods are required for fire-rated construction. See entrance manufacturer for details. When specifying door frame assemblies, also specify installation in the shaft wall in which assemblies were performance-tested.

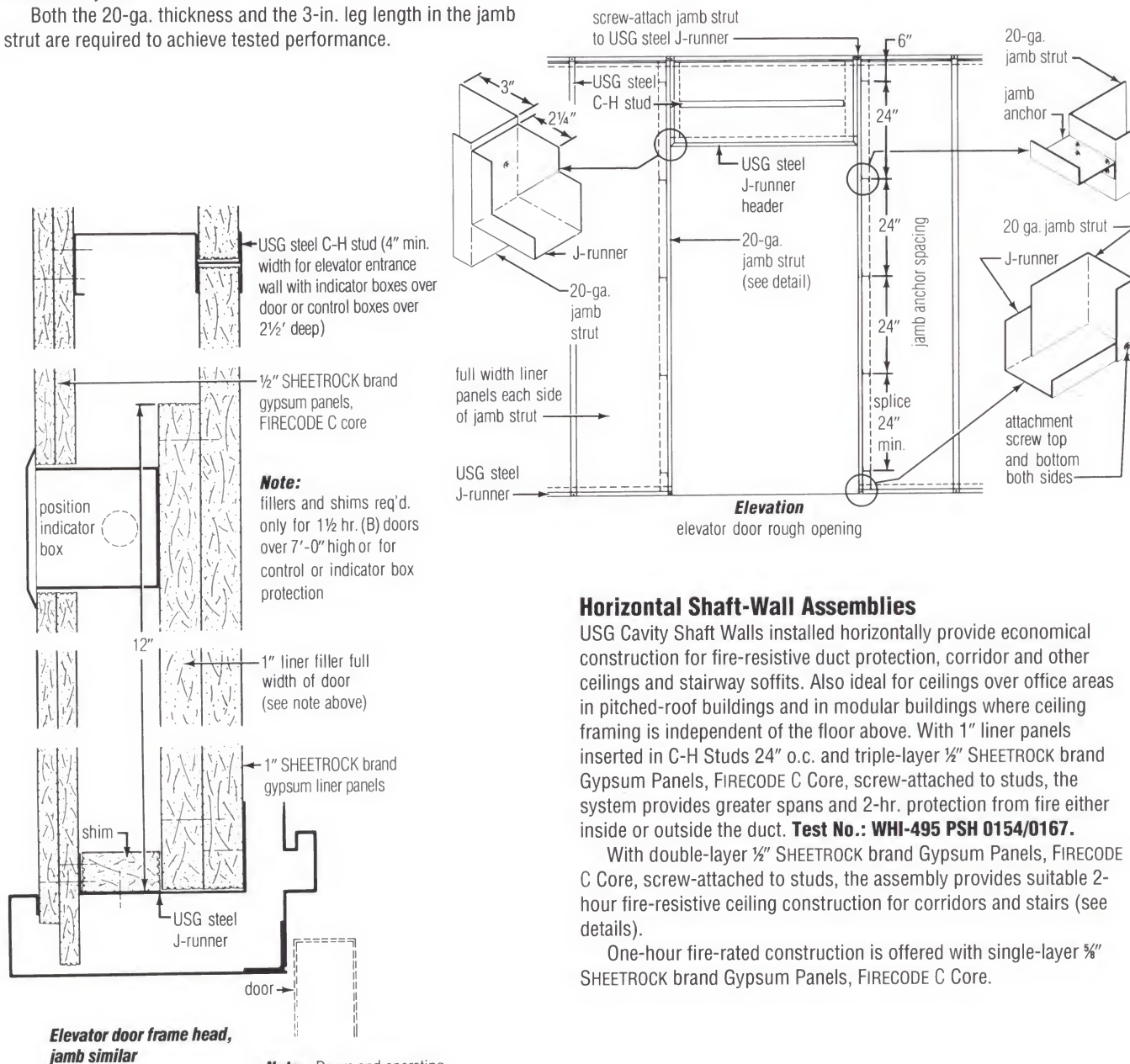
There have been many successful UL tests on door assemblies in USG Cavity Shaft Walls, some are shown at right. In every successful test, the interface between the entranceway and shaft wall was constructed with a 20-ga. jamb strut having a 3-in. leg, installed at the door jamb.

Both the 20-ga. thickness and the 3-in. leg length in the jamb strut are required to achieve tested performance.

Shaft Wall Entranceway Assemblies—1½-hr. Fire Rated

Manufacturer	Maximum opening size	Door type	UL file no.
Otis	42"x84"	center opening	R7416
Otis	48"x100 $\frac{1}{2}$ "	two-speed slide	R7416
Otis	48"x102"	center opening	R7416
Westinghouse	48"x102"	center opening	R8176
Dover	42"x96"	single slide	R6155
Dover	48"x96"	center opening	R6155
Tyler	42"x102"	single slide	R6403
Tyler	60"x108"	center opening	R6403
D A Matot	48"x78"	dumbwaiter	R6748
Hauenstein & Burmeister	48"x108"	center opening	R4153
Courion Industries	48"x84"	dumbwaiter	R2317
General Elevator	48"x84"	center opening	R10483
Columbia	42"x108"	single slide	R9642
Columbia	48"x108"	center opening	R9642

Note: Entranceways tested with UL Design U438 shaft wall and achieved a 1½-hour "B" rating. Apparent duplications are a result of tests involving different types or styles of either frames or doors.



Horizontal Shaft-Wall Assemblies

USG Cavity Shaft Walls installed horizontally provide economical construction for fire-resistive duct protection, corridor and other ceilings and stairway soffits. Also ideal for ceilings over office areas in pitched-roof buildings and in modular buildings where ceiling framing is independent of the floor above. With 1" liner panels inserted in C-H Studs 24" o.c. and triple-layer ½" SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw-attached to studs, the system provides greater spans and 2-hr. protection from fire either inside or outside the duct. **Test No.: WHI-495 PSH 0154/0167.**

With double-layer ½" SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw-attached to studs, the assembly provides suitable 2-hour fire-resistive ceiling construction for corridors and stairs (see details).

One-hour fire-rated construction is offered with single-layer 5/8" SHEETROCK brand Gypsum Panels, FIRECODE C Core.

Limitations

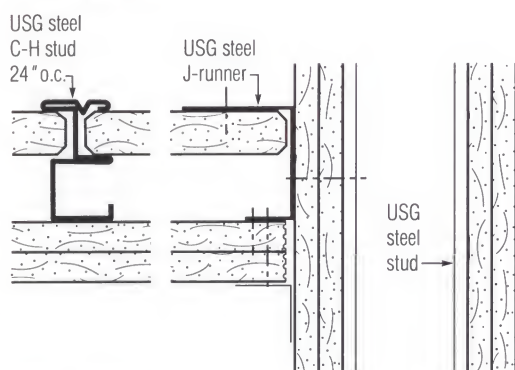
- 1 USG C-H Studs are not designed to carry live loads or mechanical equipment or provide material storage area.
- 2 Maximum stud spacing is 24" o.c.; maximum spans are shown in table below.

Limiting Spans—Horizontal Shaft Walls⁽¹⁾

Stud style	Single-layer ½" gypsum panels ⁽²⁾	Double-layer ½" gypsum panels ⁽²⁾	Triple-layer ½" gypsum panels ⁽²⁾
212CH25	6'7"	6'0"	6'5"
212CH22	9'4"	8'6"	7'11"
212CH20	10'3"	9'2"	8'3"
400CH25	8'8"	7'10"	8'6"
400CH20	14'6"	13'2"	12'0"
600CH20	17'5"	15'10"	13'8"

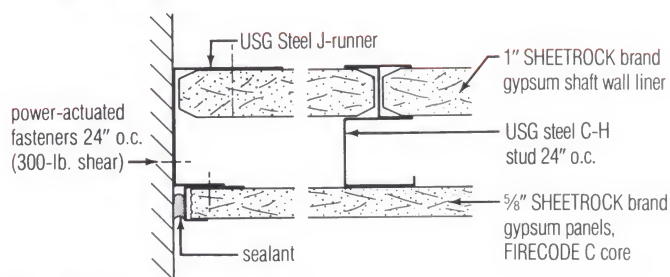
(1) Based on L/240 allowable deflection and JR24 runner. (2) Allowable steel stress reduced 50%.
(3) Full steel stress allowed based on ASTM E119.

2-Hr. fire rated assembly (see NER 258)



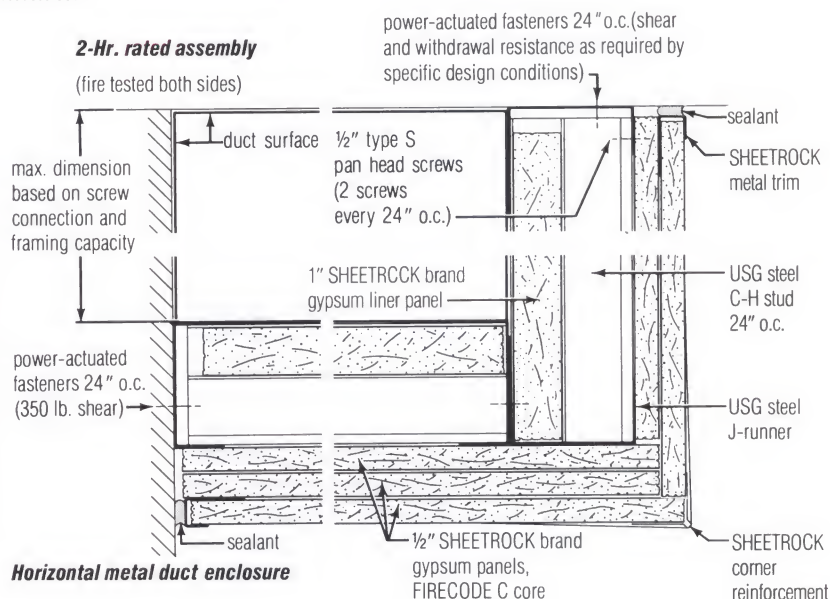
For stair soffit

1-Hr. fire rated assembly (see NER 258)



Corridor ceiling and stair soffit

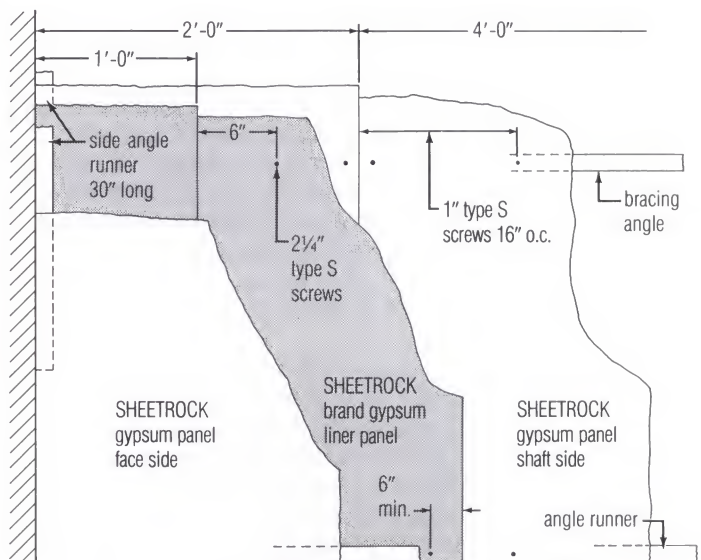
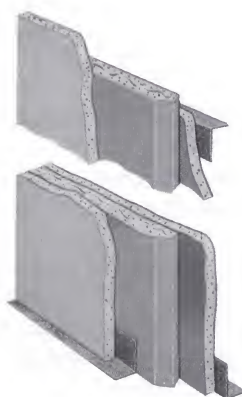
2-Hr. rated assembly (fire tested both sides)



Horizontal metal duct enclosure

Vent Shaft Enclosure

USG Vent Shaft System provides a vent enclosure for vertical shafts in apartments and other types of multi-story buildings. The 2-hr. fire rating meets UL Design U505. This shaft assembly is particularly suited for structures having a number of relatively small and widely separated mechanical, service and ventilator shafts. For vent shaft runs 4' or less, the horizontal bracing angle may be omitted. The liner may be installed to the angle runners with double facing layers of 5/8" FIRECODE Core Panels (CEG 6-26-89).



Vent shaft elevation

Good Design Practices

1 System Performance—United States Gypsum Company will provide test certification for published fire, sound and structural data covering systems designed and constructed according to its published specifications. Tests are conducted on Company products assembled to meet performance requirements of established test procedures specified by various agencies. System performance following substitution of materials or compromise in assembly design cannot be certified; failure may result under critical conditions.

2 Control Joints—Shaft wall surfaces should be isolated with control joints or other means where: **(a)** construction changes within the plane of the shaft wall; **(b)** shaft wall run exceeds 30'. Ceiling-height door frames may be used as control joints, as may less-than-ceiling-height door frames if control joints extend to ceiling from both corners. Location of control joints is the responsibility of the design professional/architect.

3 Penetrations of the diaphragm, such as door frames and duct openings, require additional reinforcement at corners to distribute concentrated stresses if a control joint is not used. Penetrations greater than 48" wide require supplemental support for the shaft wall at the opening. Where access panels or large duct penetrations occur in shafts having pressure loads, headers, sills and adjacent channels may require reinforcing to properly distribute these loads.

4 Pressure Loads—Where shaft walls enclose elevator and return air vents, and intermittent pressures up to 15 psf are expected, sealant is recommended at intersections with floors, ceilings, columns, ducts, etc. to seal peripheries and penetrations and minimize whistling and dirt accumulation due to air movement. Shaft walls may be used for air handling with sustained pressures up to 10 psf. Sealant selection including joint treatment, surface coatings and details to seal the wall under these sustained pressures must be provided by the designer. When air pressure exceeds 10 psf, the air handling should be contained with a metal duct.

5 Screws—Type S Screws are suitable for gypsum panel or gypsum base attachment to 25, 22 and 20-ga. steel studs. Type S-12 screws should be specified for other applications to steel heavier than 20-ga. Screw lengths should be 1" for base layer and 1 $\frac{1}{2}$ " for face layer and at least $\frac{3}{4}$ " longer than the total thickness for other applications.

6 Steel Frame Construction—Runners and studs attached to beams and columns should be installed before steel is spray-fireproofed. Excess fireproofing should be removed from runners and studs before installing shaft wall liner and sealant.

7 Steel door frames, ordered separately, should be at least 16-ga. steel, shop primed, and have throats accurately formed to overall thickness of the shaft wall plus $\frac{3}{8}$ " minimum. They should be anchored at floor with 16-ga. steel plates welded to trim flanges, with provision for two power-driven anchors or equal per plate. Jamb anchors should be 18-ga. steel welded in jamb and screw-attached to struts.

All one-piece frames should be spot-grouted after shaft wall liner is installed. Apply SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound just before inserting face layer into frame. If necessary, cut out board to provide relief at jamb anchor. Do not terminate panels against trim return. Provide bracing where required by installing diagonal bracing from jamb strut-studs to structure.

8 Height—Where cavity shaft wall height exceeds max. available panel height, liner panel end joints should be positioned within the upper and lower third-points of wall. Joints may be butted

together if factory edge or reinforced with horizontal C-H stud or USG H-spline cut to fit between adjacent vertical studs. Walls over 16' high should have studs screw-attached to runners. Also, joints in adjacent panels should be staggered top and bottom to prevent a continuous horizontal joint.

9 Stud and Runner Selector—Size and gauge should be based on design load, allowable deflection and end reaction/bending stress.

10 Electric Boxes—Cavity shaft walls will accommodate outlet boxes with depths up to the stud width.

11 Standards—The following standards apply: ASTM C-36—Standard Specification for Gypsum Board; ASTM A-446—Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality; ASTM-C-475—Standard Specification for Joint Treatment Materials for Gypsum Wallboard Construction; ASTM A-525—Standard Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process; ASTM C-645—Standard Specification for Non-Load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board; ASTM C-754—Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Board, Backing Board, or Water-Resistant Backing Board; ASTM C-840—Standard Specification for Application and Finishing of Gypsum Board; ASTM C-1002—Standard Specification for Steel Drill Screws for the Application of Gypsum Board; ASTM C-1047—Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.

12 Additional Information—See *WB-1991 USG Cavity Shaft Wall System: The Surest Way to the Top* and the following technical folders in this series: *SA-100 Construction Selector*; *SA-920 Plaster Systems*; *SA-927 Gypsum Panels and Accessories*; and *SA-933 Texture Products and Finishes*.

Architectural Specifications

Part 1: General

1.1 Scope—Specify to meet project requirements.

1.2 Qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed instructions.

Upon request United States Gypsum Company will provide certification that its products conform to the applicable Company and ASTM standards as well as meet the performance values identified herein.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Submittals

Submit certification of compliance with fire and sound requirements indicated. Fire rating compliance shall include verification of compatibility with labelled elevator door frame installation and test verification of call box and similar penetrations. Provide additional certification as follows:

1. Fire test verification of damper penetration acceptability.
2. Fire test verification of horizontal Shaft Wall installation.
3. Test verification of fatigue failure resistance through 1,000,000 cycles at a pressure of 7.5 psf and at a maximum deflection of L/240.
4. Samples of studs that exhibit continuous edge support of liner panels.
5. Code compliance documentation.

1.5 Environmental Conditions

- A** In cold weather during gypsum panel joint finishing, temperatures within the building shall be maintained within the range of 55° to 70°F (13° to 21°C). Adequate ventilation shall be provided to carry off excess moisture.
- B** For gypsum base and veneer finish application, SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound and SHEETROCK Joint Tape shall be used on all joints and internal corners and allowed to set thoroughly before plaster application.

1.6 Protection

All materials shall be suitably protected from the weather during installation to prevent damage to the shaft wall.

Part 2: Products

2.1 Materials

- A** Liner Board—1" SHEETROCK brand Gypsum Liner Panels, beveled edge, 24" wide, lengths as required. Identified with UL Classification label.
- B** Faceboards—(1/2") (3/4") (1") thick, 48" wide, tapered edge, SHEETROCK brand Gypsum Panels, (SW Edge) (FIRECODE Core) (FIRECODE C Core) (ULTRACODE Core), lengths as required. Identified with UL Classification label.
- C** Gypsum Base—(1/2") (3/4") thick, 48" wide, square-edge IMPERIAL FIRECODE C Gypsum Base, lengths as required.
- D** Joint Treatment—(select a United States Gypsum Company Joint System).
- E** Fasteners—Screws: (3/8") (1/2") Type (S) (S-12) pan head; 3/8" Type S-12 low profile head; (1") (1 1/4") (2 1/4") Type S bugle head. DUROCK Steel Screws: 1 1/2".
- F** SHEETROCK Metal Trim—No. (200A) (200B) (401) (402) (701B) (801B).
- G** SHEETROCK Corner Bead—(DUR-A-BEAD) (No. 800) (No. 900).
- H** UNIMAST Metal Furring Channels.
- I** RC-1 Resilient Channels.
- J** USG Steel C-H Studs, (212CH25) (212CH22) (212CH20) (400CH25) (400CH20) (600CH20) hot-dipped galvanized, lengths as required (select from tables).
- K** USG Steel E-Studs, (212ES25) (212ES20) (400ES25) (400ES20) (600ES25) (600ES20) hot-dipped galvanized, lengths as required (select from tables).
- L** USG Steel J-Runners, (212JR24) (400JR24) (600JR24) (212JR20) (400JR20) (600JR20) hot-dipped galvanized, for USG Steel C-H and E-Studs.
- M** Steel Jamb Struts, (212JS20) (400JS20) (600JS20) hot-dipped galvanized (for elevator door framing).
- N** Runner fasteners, power-driven type, to withstand 193 lb. single shear and 200 lb. bearing force when driven through structural head or base and without exceeding allowable design stress in runner, fastener or structural support (obtain locally).
- O** SHEETROCK Acoustical Sealant.
- P** THERMAFIBER Sound Attenuation Fire Blankets—(1") (1 1/2") (3") 24"x48".
- Q** SHEETROCK Zinc Control Joint 093.
- R** Cement Board—DUROCK Cement Board, 1/2" thickness, 36" width x (48") (60") (72") length.

Part 3: Execution

3.1 Cavity Shaft Wall Erection

- A Studs and Liner Panels**—Position steel runners at floor and ceiling with the short leg toward finish side of wall. Securely attach runners to structural supports with power driven fasteners at both ends and max. 24" o.c. With steel frame construction, install floor and ceiling runners and J-Runners or E-Studs on columns and beams before steel is fireproofed. Remove spray-

fireproofing from runners and E-Studs before installing gypsum liner panels (2-hour steel fireproofing). For other structural steel fireproofing requirements, use Z-shaped stand-off clips secured to structural steel before fireproofing application.

Cut liner panels 1" less than floor-to-ceiling height and erect vertically between J-Runners. Where shaft walls exceed max. available panel height, position liner panel end joints within upper and lower third points of wall. Stagger joints top and bottom in adjacent panels. Screw studs to runners on walls over 16'

Use steel C-H studs 3/8" to not more than 1/2" less than floor-to-ceiling height, and install between liner panels with liner inserted in the groove. Install full-length steel E-Studs or J-Runners vertically at T-intersections, corners, door jambs, and columns. Install full-length E-Studs over gypsum liner panels both sides of closure panels. For openings, frame with vertical E-Stud or J-Runner at edges, horizontal J-Runner at head and sill, and reinforcing as shown on the drawings. Suitably frame all openings to maintain structural support for wall.

Install floor-to-ceiling steel J-Runners or E-Studs each side of steel hinged door frames and jamb struts each side of elevator door frames to act as strut-studs. Attach strut-stud to floor and ceiling runners with two 3/8" Type S-12 pan head screws. Attach strut-studs to jamb anchors with 1/2" Type S-12 screws. Over steel doors, install a cut-to-length section of J-Runner and attach to strut-studs with 3/8" Type S-12 screws.

- B Resilient Channels**—Install RC-1 Resilient Channels horizontally to face of studs, within 6" of floor and ceiling and max. 24" o.c. Attach channels to studs with 3/8" Type S screws driven through holes in mounting flange. Splice channel by nesting directly over stud; screw-attach through both flanges. Reinforce with screws at both ends of splice. Install 1/2" x 3" wide continuous gypsum filler strips to top and bottom runner.

For resiliently attached finish, apply base layer horizontally to resilient channels with end joints staggered; fasten with 1" Type S screws 12" o.c. Apply face layer vertically with joints staggered; attach to channels with 1 1/2" Type S screws 12" o.c.

- C Gypsum Panels**—*Single layer one side, one hour:* apply 3/8" SHEETROCK brand Gypsum Panels, FIRECODE C Core, on corridor side. Position gypsum panel vertically and fasten to studs and runners with 1" Type S Screws 12" o.c.

Double layer one side, two hour: apply base layer vertically to studs with 1" Type S screws 24" o.c. along edges and in the field of the panels. (Apply face layer vertically and fasten to studs and J-Runners with 1 1/2" Type S screws 12" along the edges and in the field, staggered from screws in base layer. Joints between base and face layers staggered.) (Apply face layer horizontally and attach over base layer with 1 1/2" type S screws 12" o.c. in the field, along the vertical edges and to the floor and ceiling runners. Face layer attached to base layer with 1 1/2" long Type G screws midway between studs and 1" from the horizontal joint.)

Single layer both sides, two hour: apply gypsum panels vertically to both sides of studs. Fasten gypsum panels with 1" Type S screws 12" o.c. along the vertical edges and in the field.

Double layer, two hour with DUROCK Cement Board: install 1 1/2" THERMAFIBER SAFB in stud cavity. Apply base layer of 3/8" SHEETROCK brand Gypsum Panels, FIRECODE C Core, vertically and attach with 1" Type S screws 24" o.c. along vertical edges and in the field. Install face layer of 1/2" DUROCK Cement Board by lamination to gypsum panels with 4" wide strip of mastic applied with 3/8" notched trowel midway between studs and fasten to studs with 1 1/2" DUROCK Screws 6" o.c.

Double layer, two hour resilient: apply base layer to resilient channels with end joints staggered; fasten with 1" Type S screws 12" o.c. Apply face layer vertically with joints staggered; fasten to channels with 1 1/2" Type S screws 12" o.c.

Triple layer, three hour: install three layers of SHEETROCK brand Gypsum Panels, FIRECODE Core, vertically on corridor side of studs. Fasten base layer with 1" Type S screws 24" o.c. along vertical edges and in the field; mid-layer horizontally with joints staggered with 1½" Type S screws 24" o.c. along vertical edges and in the field; face layer vertically with joints staggered and fastened with 2¼" Type S screws 16" o.c. Attach face layer to J-Runners with 2¼" Type S screws 12" o.c.

Horizontal installation, two hour: install three layers of ½" SHEETROCK brand Gypsum Panels, FIRECODE Core, to horizontally installed CH and/or E-Studs. Install the base layer with the edges parallel to the studs and attached with 1" Type S screws 24" o.c.; the mid layer in the same manner with joints offset 2' and attached with 1½" Type S screws 12" o.c.; and the face layer perpendicular to the studs and attached with 2¼" Type S screws spaced 12" o.c. Place face layer end joints between studs and secure with 1½" Type G screws 8" o.c.

D Fire-Rated 2 Hour Assembly: UL Design U492—Install framing system and SHEETROCK brand Gypsum Liner Panels as described above using minimum 400CH25 studs and related accessories. Friction fit min. 3" THERMAFIBER SAFB (required) in stud cavity. Apply ¾" thick SHEETROCK brand Gypsum Panels, ULTRACODE Core, vertically with wrapped edges parallel to and fully supported by steel framing. Attach panels using 1¼" long (Type S)(Type S-12) drywall screws spaced 8" o.c. along panel edges and ends and 12" o.c. along intermediate framing.

E Fire-Rated 4-hr. Assembly—For 4-hr. assembly, erect steel runners, steel studs and liner panels as described in section A, then continue construction as follows:

Position second layer liner panels vertically over studs and fasten to studs and runners with 1½" Type S screws spaced 6" from top and bottom and 24" o.c. Apply ½" SHEETROCK brand Gypsum Panels, FIRECODE C Core, or IMPERIAL FIRECODE C Gypsum Base layer vertically over liner panels; attach with 2¼" Type S screws staggered from screws in liner panel layer, spaced 24" o.c. and driven into studs.

Install metal furring channels horizontally over gypsum panel or base at ceiling and spaced 24" o.c. vertically. Fasten top channel to studs and runner with 2¼" Type S screws spaced 12" o.c. and alternated on channel flanges. Fasten other channels to studs with screws 24" o.c. in top channel flange.

Install second layer ½" SHEETROCK brand Gypsum Panels, FIRECODE C Core, or IMPERIAL FIRECODE C Gypsum Base vertically over furring channels with vertical joints staggered 24" from joints in first layer. Fasten panels or base to channels with 1" Type S screws spaced 1" from vertical edges, 12" o.c. in top channel and 24" o.c. in other channels. Install face layer vertically over second layer with vertical joints staggered 24" and fasten to furring channels with 1½" Type S screws located ¾" and 6" from edges and spaced 12" o.c. in between.

F Vent Shaft Enclosure—Install 1½" USG Steel Runners at ceiling by fastening through web. Install 1½" x ¾" x 24-ga. galvanized steel angles as runners on floor and sidewalls by fastening through their short legs. As an alternate, steel angles may be used as ceiling runners. Install side angle runners 30" long and centered for attachment of horizontal bracing angles. Fasten runners or angles securely to structural supports with suitable fasteners 24" o.c.

Install 1½" x ¾" x 22-ga. galvanized steel bracing angles horizontally at quarter-points between floor and ceiling and spaced max. 5' o.c. Position long leg vertically for board attachment and fasten to sidewall angle with 1" Type S screws.

Install ½" SHEETROCK brand Gypsum Panels, FIRECODE C Core, vertically on shaft side and fasten to angles and runners with 1" Type S screws 16" o.c. Apply a SHEETROCK Setting-Type

(DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound, or SHEETROCK Taping or All Purpose Joint Compound Ready-Mixed, on back side of coreboard and strip or sheet-laminate to shaft-side board with vertical joints offset 12" from inner board joints.

Install second set of floor and sidewall angle runners (and ceiling angles, if required) with long legs against coreboard. Attach coreboard to runners and angles with 2¼" Type S screws 12" o.c. and at least 6" away from coreboard edges.

Using strip or sheet method, laminate floor-side face board to coreboards. Install face boards vertically with joints offset 12" from coreboard joints. Apply moderate pressure when placing boards to assure good adhesive bond. Fasten to coreboard with 1½" Type G screws.

Drive screws approx. 24" from ends of boards and 36" o.c. along lines ½" from vertical edges. Temporary nails or support bracing installed 16" to 24" o.c. may be used instead of screws to maintain bond until adhesive is hard and dry. After all attachments are made, wipe off any adhesive forced out at joints and edges. Caulk perimeter of face panels with SHEETROCK Acoustical Sealant to prevent air infiltration.

3.2 Accessory Application

A Gypsum Panel Joints—Finish all face layer joints and internal angles with a United States Gypsum Company Joint System installed according to manufacturer's directions. Spot exposed fasteners on face layers and finish corner bead, control joints and trim as required, with at least three coats of joint compound, feathered out onto panel faces and sanded smooth.

B Corner Bead—Reinforce all vertical and horizontal exterior corners with DUR-A-BEAD Corner Bead fastened with clinch-on tool or staples 9" o.c. on both flanges along entire length of bead.

C Metal Trim—Where shaft wall terminates against masonry or other dissimilar material, apply metal trim over face layer edge and fasten with screws or staples spaced 9" o.c.

D Screws—Power-drive at least ¾" from edges or ends of gypsum panels to provide uniform dimple ½" deep. In gypsum base, set flush with surface without tearing face paper.

E Control Joints—Break panels behind joint. Apply acoustical sealant to fill gap and attach control joint to face layer with staples spaced 6" o.c. on both flanges along entire length of joint.

Product Information and Literature: 1-800-USG-4YOU (1-800-874-4968).

Sales Offices: Arizona: Phoenix, (602) 866-0795; California: Fremont, (510) 792-4400, Glendale, (818) 956-1882; Florida: Jacksonville, (904) 764-3293, Miami, (305) 557-4501; Georgia: Atlanta, (404) 393-0770; Hawaii: Honolulu, (808) 591-8815; Illinois: Chicago, (312) 606-5488; Indiana: Indianapolis, (317) 848-1513; Louisiana: New Orleans, (504) 241-2020; Maryland: Baltimore, (410) 355-2200; Massachusetts: Charlestown, (617) 241-8530; Michigan: Southfield, (313) 569-1900; Minnesota: Bloomington, (612) 854-4233; Missouri: St. Louis, (314) 349-0980; New York: Albany, (518) 458-7437, Stony Point, (914) 786-2820; North Carolina: Charlotte, (704) 552-7402; Ohio: Cleveland, (216) 899-7333; Oregon: Beaverton, (503) 626-8864; Pennsylvania: Philadelphia, (410) 355-2200, Pittsburgh, (800) 289-4874; Tennessee: Nashville, (615) 361-8419; Texas: Dallas, (214) 490-0771, Houston, (713) 868-9937; Utah: Salt Lake City, (801) 266-4975; Virginia: Richmond, (804) 285-7528; International Division: Chicago, (312) 606-5840.

Metric Specifications: USG Corporation, through its operating subsidiaries, will provide metric conversions on its products and systems to help specifiers match metric design sizes. In addition, some products are available in metric dimensions from selected manufacturing plants. Refer to SA-100 Construction Selector for additional information and a Table of Metric Equivalents.

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Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

Notice: We shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Our liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered.

United States Gypsum Company

125 South Franklin Street

P.O. Box 806278

Chicago, Illinois 60680-4124

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Gypsum Panels & Accessories

There is only one SHEETROCK—the brand of gypsum panels for interior walls and ceilings developed and constantly improved by United States Gypsum Company.

A SHEETROCK brand Gypsum Panel is mill-fabricated and composed of a fire-resistant gypsum core encased in a heavy natural-finish paper on the face side and a strong liner paper on the back side. The face paper is folded around the long edges to reinforce and protect the core, and the ends are square-cut and finished smooth.

Gypsum panels are produced in specialized forms for various applications. Complementing these is the industry's broadest line of accessories, adhesives and joint treatment materials to provide complete partition and ceiling assemblies.

Interior walls and ceilings built with SHEETROCK brand Gypsum Panels gain a durable surface suitable for most types of decorative treatment and for repeated decoration during the life of the building. Joints between adjacent panels may be reinforced and concealed with a United States Gypsum Company joint treatment system, or featured by leaving exposed or covering with decorative mouldings.

Dry Construction—factory-produced gypsum panels eliminate excessive moisture in construction.

Speed—panels are easily cut and quickly applied.

Quick Decoration—essentially a “dry” material, gypsum panels permit painting or other decoration, and the installation of metal or wood trim, almost immediately.

Fire Protection—the gypsum core will not support combustion or transmit temperatures greatly in excess of 212°F until completely calcined—a slow process. See *Construction Selector SA-100* for fire-resistance ratings.

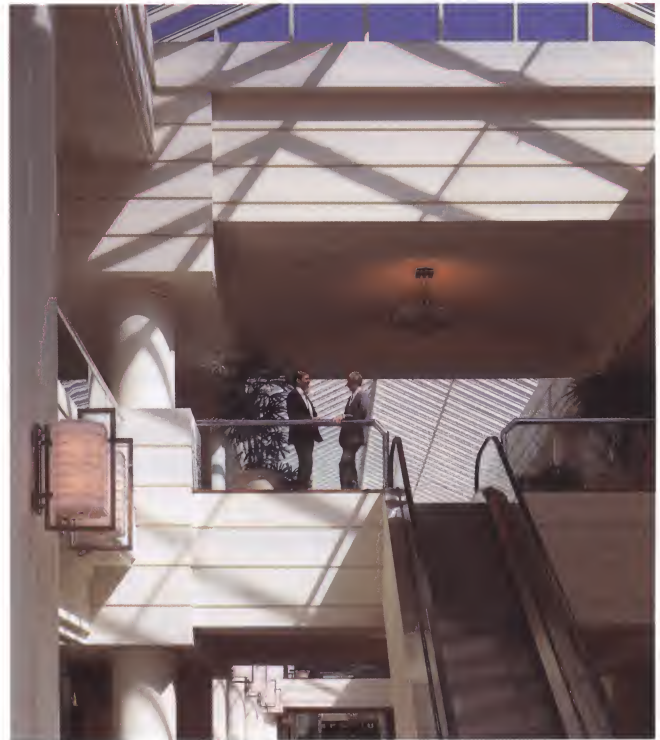
Crack Resistance—with joints reinforced with a United States Gypsum Company joint system, SHEETROCK brand Gypsum Panels form walls and ceilings highly resistant to cracks caused by frame movement, vibration or minor settling.

Non-Warping—expansion or contraction under normal atmospheric changes is negligible.

Availability—over 20 strategically located operating plants produce and/or stock the gypsum panel materials described here.

General Limitations

- 1 Exposure to excessive or continuous moisture and extreme temperatures should be avoided. Gypsum board is not recommended in solar heating systems where board will be in contact with surfaces exceeding 125°F (52°C).
- 2 Must be adequately protected against wetting when used as a base for ceramic wall tile (see foil-back panel limitation). Use SHEETROCK brand Gypsum Panels, Water-Resistant, for this purpose.
- 3 Maximum spacing of framing members: $\frac{1}{2}$ " and $\frac{3}{8}$ " gypsum panels are designed for use on framing centers up to 24"; $\frac{1}{4}$ " and $\frac{3}{16}$ " panels on centers up to 16". In both walls and ceilings when $\frac{1}{2}$ " or $\frac{3}{8}$ " gypsum panels are applied across framing on



24" centers and joints reinforced, blocking is not required. Neither $\frac{3}{8}$ " nor $\frac{1}{4}$ " SHEETROCK brand Gypsum Panel is recommended for use on steel framing nor as base for water-based texturing materials. When a water-based texture is used on ceilings with framing 24" o.c., $\frac{3}{8}$ " gypsum panels, $\frac{1}{2}$ " FIRECODE C core panels, or $\frac{1}{2}$ " SHEETROCK brand Interior Gypsum Ceiling Board should be used to prevent sag.

- 4 Application of SHEETROCK brand Gypsum Panels over $\frac{3}{4}$ " wood furring applied across framing is not recommended since the relative flexibility of the furring under impact of the hammer tends to loosen nails already driven. Furring should be 2"x2" minimum (may be nom. 1"x4" if panels are to be screw-attached).
- 5 The application of gypsum panels over an insulating blanket that has first been installed continuously across the face of the framing members is not recommended. Blankets should be recessed and the blanket flanges attached to sides of studs or joists.
- 6 To prevent objectionable sag in new gypsum panel ceilings, the weight of overlaid unsupported insulation should not exceed 1.3 psf for $\frac{1}{2}$ " thick panels with frame spacing 24" o.c.; 2.2 psf for $\frac{1}{2}$ " panels on 16" o.c. framing (or $\frac{1}{2}$ " SHEETROCK brand Interior Gypsum Ceiling Board on 24" o.c. framing) and $\frac{3}{8}$ " panels 24" o.c.; $\frac{3}{8}$ " thick panels must not be overlaid with unsupported insulation. A vapor retarder should be installed in exterior ceilings, and the plenum or attic space should be properly vented.

During periods of cold or damp weather when a polyethylene vapor retarder is installed on ceilings behind the gypsum board, it is important to install the ceiling insulation before or immediately after installing the ceiling board. Failure to follow this procedure may result in moisture condensation on the back side of the gypsum board, causing the board to sag.

Water-based textures, interior finishing materials and high ambient humidity conditions can produce sag in gypsum ceiling panels if adequate vapor and moisture control is not provided. The following precautions must be observed to minimize sagging of ceiling panels:

- a) Where vapor retarder is required in cold weather conditions, the temperature of the gypsum ceiling panels and vapor retarder must remain above the interior air dew point temperature during and after the installation of panels and finishing materials.
- b) The interior space must be adequately ventilated and air circulation must be provided to remove water vapor from the structure.

Most sag problems are caused by the condensation of water within the gypsum panel. The placement of vapor retarders, insulation levels and ventilation requirements will vary by location and climate and should be reviewed by a qualified engineer if in question.

- 7 To produce final intended results, certain recommendations regarding surface preparation, painting products and systems must be adhered to for satisfactory performance. Refer to Good Design Practices and Architectural Specifications.
- 8 Precaution should be taken against creating a double vapor retarder by using gypsum panels as a base for highly water vapor-resistant coverings when the wall already contains a vapor retarder. Moreover, do not create a vapor retarder by such wall coverings on the interior side of exterior walls of air-conditioned buildings in hot-humid climates where conditions dictate a vapor retarder location near the exterior side of the wall. Such conditions require assessment by a qualified mechanical engineer.
- 9 Adhesives for attaching vinyl-faced gypsum panels to studs must be marked for application with vinyl-faced gypsum panels. Compliance with ASTM C557 does not assure that the adhesive was tested for compatibility with vinyl-faced gypsum panels.
- 10 In order to avoid yellow staining and show-through of stud adhesives onto the surfaces of the gypsum panels, and delamination of the vinyls on vinyl-faced gypsum panels caused by the adhesive, solvent-based gypsum panel stud adhesives should not contain acetone, heptane, hexane, toluene or xylene.

Where to use SHEETROCK brand Gypsum Panels

			Interior Walls										
			Single layer					Double layer					
			Over existing walls	Masonry (furred)	Wood framing	Steel framing	Masonry & concrete (direct)	Masonry (furred)		Wood framing		Steel framing	
Regular						Base	Finish	Base	Finish	Base	Finish		
SHEETROCK [®] Brand	1/4"												
	3/8"												
	1/2"												
ULTRACODE													
SHEETROCK [®] Brand	3/4"												
ULTRACODE [®] CORE													
FIRECODE													
SHEETROCK [®] Brand	5/8"												
FIRECODE [®] CORE Type X													
FIRECODE C													
SHEETROCK [®] Brand	1/2"												
FIRECODE [®] C CORE Type X	5/8"												
Foil-Back ⁽¹⁾													
SHEETROCK [®] Brand	3/8"												
Foil Back Panels	1/2" & 5/8"												
Water-Resistant ⁽²⁾													
SHEETROCK [®] Brand	1/2" & 5/8"												
Water Resistant													
Interior Ceiling Board													
SHEETROCK [®] Brand	1/2"												
Interior Ceiling Board													
Exterior Ceiling Board													
SHEETROCK [®] Brand	1/2"												
Exterior Ceiling Board													
TEXTONE													
TEXTONE [®] Brand	1/2" & 5/8"												
Vinyl Covered Panels													
Gypsum Sheathing													
SHEETROCK [®] Brand	1/2"												

(1) Not recommended in hot-humid climates. (2) Recommended as a base for ceramic or other tile. Also available in FIRECODE and FIRECODE C Cores (3) Not recommended as a base for ceramic tile or as a base layer for TEXTONE Vinyl-Faced Gypsum Panels in double-layer systems.

Technical Data

SHEETROCK brand Gypsum Panels comply with ASTM C36. Thermal coefficient of expansion (unrestrained): 9.0×10^{-6} in. per in. per deg. F (40°-100°F); hygrometric coefficient of expansion (unrestrained): 7.2×10^{-6} in. per in. per % r.h. (5%-90% r.h.). Surface burning characteristics: flame spread 15, smoke developed 0.

Interior Gypsum Panel Products

SHEETROCK brand Gypsum Panels have long edges tapered on the face side to form a shallow channel for joint reinforcement. Made in the three thicknesses shown below for specific purposes.

— $\frac{1}{2}$ ", for single-layer application in new residential construction and remodeling.

— $\frac{3}{8}$ ", lightweight, applied principally in the double wall system over wood framing and in repair and remodel work.

— $\frac{1}{4}$ ", a lightweight, low-cost utility gypsum panel, used as base layer for improving sound control in double-layer steel and wood stud partitions and for use over old wall and ceiling surfaces. Also for forming curved surfaces with short radii.

Width: 4'; length: 8', 9', 10', 12' or 14' (except $\frac{1}{4}$ ", available in 8' and 10' lengths only); edges: tapered; finish: natural-finish face paper, suitable for paint or other decoration.

SHEETROCK brand Gypsum Panels, SW Edge, have an exclusive tapered rounded edge design to help minimize ridging or beading and other joint imperfections and help compensate for extremes of temperature and humidity during construction. The SW system produces a stronger joint than with regular gypsum panels.

This is accomplished by pre-filling gypsum panel joints with SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound formulations which chemically harden, providing maximum bond and minimum shrinkage. No more compound is required than with regular panels. Taping and other application procedures are conventional.

Except for the rounded edge, SW Panels are tapered like, and otherwise identical to, regular tapered-edge gypsum panels. Made in $\frac{1}{2}$ " and $\frac{3}{8}$ " thicknesses.

SHEETROCK brand Gypsum Panels, ULTRACODE Core, made $\frac{3}{4}$ " thick, provide 1-, 2-, 3- and 4-hr. fire ratings with fewer layers of gypsum panels than are usually required when used in approved designs. Because fewer layers are needed, ULTRACODE Core panels provide reduced labor costs and reduced material costs. Also provide added abuse-resistance. Width: 4'; lengths: 8', 9', 10' or 12'; edge: tapered; finish: manila face paper, suitable for paint, or other decoration. Refer to SA-923 for complete information.

Interior of Exterior Walls								Ceilings							
Single layer			Double layer				Over existing ceiling	Single layer		Double layer				Acoustical base	
Masonry (furred)	Wood or steel framing	Rigid insulation board	Masonry (furred) Base	Finish	Wood or steel framing Base	Finish		Wood framing	Steel framing	Wood framing Base	Finish	Steel framing Base	Finish	Over suspended metal grillage	Over channel
				X		X	X								
				X		X	X	X		X	X				
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
X	X			X	X	X	X	X	X	X	X	X	X	X	X
X	X			X	X	X	X	X	X	X	X	X	X	X	X
X	X			X	X	X	X	X	X	X	X	X	X	X	X
				X ⁽³⁾		X ⁽³⁾		X		X					
X	X			X ⁽³⁾		X ⁽³⁾		X	X	X		X			
X	X	X													
								X	X						
								X	X						
Exterior of Exterior Walls															
X	X	X	X	X	X	X	X								

SHEETROCK brand Gypsum Panels, FIRECODE Core, made $\frac{3}{8}$ " thick, combine all the advantages of regular panels with additional resistance to fire. Comply with ASTM C36 for a Type X gypsum board and meet the definition of a Type X gypsum board for fire-rated assemblies in the Gypsum Association Fire Resistance Design Manual. Width: 4'; length: 8', 9', 10', 12' or 14'; edges: SW tapered or tapered; finish: natural-finish face paper, suitable for paint, wall paper or other decoration.

SHEETROCK brand Gypsum Panels, FIRECODE C Core, made in $\frac{3}{8}$ " and $\frac{1}{2}$ " thicknesses, provide improved fire protection over standard FIRECODE panels as a result of a specially formulated core containing additives that enhance the integrity of the core under fire exposure. Comply with Type X requirements.

Systems using these gypsum panels have qualified for fire ratings of up to 4 hours in walls, 3 hours in ceilings, 4 hours for column protection. Construction Selector shows the many variations of tested assemblies.

Limitations (also refer to General Limitations, page 1): (1) In order to attain fire-resistance ratings, the construction of the partition and/or floor and ceiling assemblies must conform to the system designs as tested at the indicated fire testing facilities (see System Folders). (2) Max. frame member spacing: 24" o.c.

SHEETROCK brand Gypsum Panel Application and Frame Spacing

Thickness	Approx. panel weight psf	Location	Application method	Max. frame spacing o.c.
$\frac{3}{8}$ " ⁽¹⁾	1.4	ceilings ⁽²⁾⁽³⁾	perpendicular	16"
$\frac{3}{8}$ " ⁽¹⁾	1.4	sidewalls	perpendicular or parallel	16"
$\frac{1}{2}$ "	1.8	ceilings	parallel ⁽³⁾	16"
$\frac{1}{2}$ "	1.8	sidewalls	perpendicular or parallel	24" ⁽⁴⁾
$\frac{5}{8}$ "	2.3	ceilings	parallel ⁽³⁾	16"
$\frac{5}{8}$ "	2.3	sidewalls	perpendicular or parallel	24"

(1) For wood framing only. Also see general limitations, page 1. (2) Not recommended below unheated spaces. (3) Not recommended if water-based texturing material is to be applied. (4) Max. spacing 16" if water-based texturing material is to be applied. If $\frac{1}{2}$ " SHEETROCK brand Interior Gypsum Ceiling Board is used, max. spacing is 24".

SHEETROCK brand Gypsum Panels, Foil-Back, are made by laminating special kraft-backed aluminum foil to back surface of regular or SW tapered panels with FIRECODE and FIRECODE C cores as indicated above. Effective as a vapor retarder for walls and ceilings when applied with foil surface next to the framing in single-layer application or as the base layer in multi-layer systems. SHEETROCK brand Gypsum Panels, Foil-Back, provide a water vapor retarder to help prevent interior moisture from entering wall and ceiling spaces. In tests per ASTM E96 (desiccant method), $\frac{1}{2}$ " foil-back panels showed a vapor permeance of 0.06 perm.

These panels are designed for interior use with furred masonry, wood or steel framing. In air conditioned buildings in climates having sustained high outside temperature and humidity, a qualified mechanical engineer should determine vapor retarder location.

Limitations: Not recommended as a base for ceramic or other tile or as base layer for TEXTONE Vinyl-Faced Gypsum Panels or other highly moisture-resistant wall coverings. Also not to be used in hot, humid climates such as the Southern Atlantic and Gulf Coast areas.

Thickness: $\frac{3}{8}$ ", $\frac{1}{2}$ " and $\frac{5}{8}$ ". Sizes, edges and finish: same as for base panels.

SHEETROCK brand Gypsum Panels, Water-Resistant, are a proven water-resistant base for the adhesive application of ceramic and plastic tile and plastic-faced wall panels. Made water-resistant all the way through: (1) multi-layered face and back paper are chemically treated to combat penetration of moisture; (2) the gypsum core is

made water-resistant with a special composition. The panel is easily recognized by its distinctive green face.

Available in $\frac{1}{2}$ " and $\frac{3}{8}$ " thickness; in $\frac{1}{2}$ " FIRECODE C Core and $\frac{3}{8}$ " FIRECODE Core. Surface burning characteristics: flame spread 20, smoke developed 0. Comply with ASTM C630. Width: 4'; length: 8', 10' or 12'; edges: tapered; finish: green treated paper, suitable for receiving tile, paint or wallpaper.

Limitations: Not recommended for ceilings where framing is greater than 12" o.c., for single-layer resilient attachment where tile is to be applied or in remodeling unless applied directly to studs. Panels should not be installed over a vapor retarder or on a wall acting as a vapor retarder unless it will not be tiled or finished with an impervious paint. Store in an enclosed shelter and protect from exposure to the elements. Panels are not intended for use in areas subject to constant moisture such as gang showers and commercial food processing; DUROCK Cement Boards are recommended for these uses (see Folder SA-932).

Bending of SHEETROCK brand Gypsum Panels⁽¹⁾

Panel thickness	Bending radii with dry panels				
	Panel applied with long dimension perpendicular to framing		Panel applied with long dimension parallel to framing		
	in.	mm	ft	m	
$\frac{1}{2}$ "	6.4	5 ⁽²⁾	1.5	15	4.6
$\frac{3}{8}$ "	9.5	7 $\frac{1}{2}$	2.3	25	7.6
$\frac{1}{4}$ "	12.7	20 ⁽²⁾	6.1	—	—

(1) For steel-framed systems and bending with wetted panels, see folder SA-923. (2) Bending two $\frac{1}{4}$ " pieces successively permits radii shown for $\frac{1}{2}$ " panels. NOTE: By moistening the face and back paper thoroughly prior to application, and replacing in the stack for at least one hour, the panel may be bent to still shorter radii. When the panel dries thoroughly, it will regain its original hardness.

TEXTONE Vinyl-Faced Gypsum Panels are conventional gypsum panels with factory-applied vinyl facings in a wide range of coordinated decorator colors. The panels are used for predecorated permanent partitions, relocatable partitions or in remodeling. Not recommended as a finish layer over foil-back gypsum panels or on exterior walls in hot and humid climates unless suitable vapor control is provided by mechanical engineer. See Technical Folder SA-928 for descriptions and specifications.

SHEETROCK brand Gypsum Coreboard has a 1" thick gypsum core encased in strong, gray paper on both sides. It is used in laminated gypsum partitions with additional layers of gypsum panels applied to the coreboard to complete the wall assembly. Manufactured with "V" T&G edges for use in solid partitions or with square edges and prescored 6" to 8" o.c. Coreboard strips are then easily snapped and separated from this master unit. Thickness: 1"; width: 24"; edges: "V" T&G or square; length: 8', 9', 10' and 12' (prescored—7' 8" lengths only); finish: gray paper, unsuitable as exposed surface. (Special order availability prevails in some markets.) Meets ASTM C442.

SHEETROCK brand Gypsum Liner Panels have a special 1" thick gypsum core for added fire resistance and multi-layered green paper facings that are treated to resist moisture penetration. Used in Shaft Wall Partitions (see Folder SA-926), Area Separation Fire/Party Walls (see Folder SA-925), High-Attenuation Double Wall Systems (see Folder SA-923) and High Performance Floor Ceiling Assemblies (see SA-924). Panels have beveled edges, are 1" thick, 24" wide, and in lengths up to 16' (14' in some markets).

SHEETROCK brand Interior Gypsum Ceiling Board, a $\frac{1}{2}$ " thick panel, supports water-based spray texture paints and insulation like $\frac{3}{8}$ " thick board but with in-place construction costs that are less. Special gypsum core contains additives which increase sag-resistance. Lightweight for easy handling. Surface burning characteristics: flame spread 15, smoke developed 0. Recognized by NER 458 code compliance document. Thickness: $\frac{1}{2}$ "; width: 4'; lengths: 8' and 12'; edges: tapered. Meets ASTM C36.

Exterior Gypsum Panel Products

SHEETROCK brand Exterior Gypsum Ceiling Board is a weather- and sag-resistant board designed for the soffit side of eaves, canopies and carports and other commercial and residential exterior applications with indirect weather exposure. It is noncombustible, is simply scored and snapped for quick application, and offers excellent paintability. Surface burning characteristics: flame spread 20, smoke developed 0. Meets ASTM C931.

Installed conventionally in wood and steel-framed soffits; batten strips or mouldings used over butt joints or treated joints; backing strips required for small vent openings. Has beige, water-repellent face paper. Thickness: $\frac{1}{2}$ "; widths: 4'; lengths: 8' and 12'; edges: SW tapered. Also available $\frac{5}{8}$ " thick with FIRECODE core which is suitable for fire-rated assemblies.

SHEETROCK brand Gypsum Sheathing is a fire-resistant gypsum board, with water-resistant gypsum core encased in specially formulated black water-repellent paper on both sides and long edges. Its weather resistance, water repellence, fire resistance and low applied cost make it suitable for use in exterior curtain wall construction; also a popular choice for wood-framed garden apartments and light commercial buildings (see Folder SA-924 for application and specifications). Meets ASTM C79. Available 24" wide, 8' length with V-shaped T&G long edges and 48" wide, 8' and 9' lengths with square edges. Thickness: $\frac{1}{2}$ " Regular and $\frac{5}{8}$ " FIRECODE core sheathing boards.

GYP-LAP Gypsum Sheathing is a weather- and fire-resistant board used in exterior curtain walls and in frame construction (see Folder SA-924). Lightweight board has noncombustible gypsum core clad in water-repellent paper on face and back surfaces. Meets ASTM C79. Available in western U.S., $\frac{1}{2}$ " thick, 24" wide, 8' length with V-shaped T&G long edges and 48" wide, 8' length with square edges. Also available: $\frac{5}{8}$ " thick FIRECODE core sheathing board.

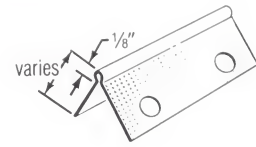
Paper-Faced Sheathing Limitations

- 1 Sheathing may be stored outside for up to one month, but must be stored off the ground and have protective covering.
- 2 Maximum stud spacing is 24" o.c.
- 3 When applied to a structure, sheathing must not be left exposed to the elements for more than one month unless the procedure as outlined in limitation 6 is followed.
- 4 Exterior finish systems must be properly caulked for the life of the job, particularly around all cuts.
- 5 Exterior finish systems applied over gypsum paper-faced sheathing must be applied with mechanical fasteners through the sheathing into the wall framing. Alternate methods of application are not endorsed and their performance and that of the substrate are solely the responsibility of the specifier. Direct application of paint, texture finishes and coatings over gypsum sheathing are not recommended.
- 6 For in-place exposure up to six months, all gaps resulting from cuts, corners, joints and machine end cuts of the sheathing should be filled with exterior caulk at time of erection.
- 7 For curtain wall construction, cover gypsum paper-faced sheathing with No. 15 asphalt felt within 30 days of sheathing erection. Felt should be applied horizontally with 2" overlap and immediately anchored with metal lath, masonry ties or corrosion-resistant screws or staples.
- 8 Sheathing for exterior ceilings and soffits is not recommended unless covered with metal lath and exterior stucco.

Metal Trim Accessories

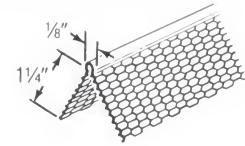
DUR-A-BEAD Corner Bead

Part of the family of SHEETROCK Metal Products. All-metal galvanized steel reinforcement, protects external corners. Concealed with United States Gypsum Company joint compounds for a smooth, finished corner. Provides superior joint compound adhesion. Available in two flange widths: No. 103 $1\frac{1}{4}$ "x $1\frac{1}{2}$ " and No. 104 $1\frac{1}{2}$ "x $1\frac{1}{2}$ ".



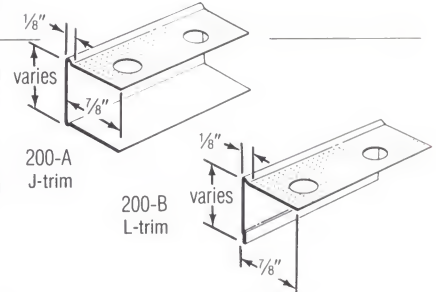
SHEETROCK Expanded Flange Corner Bead

Galvanized steel external corner reinforcement with $\frac{1}{4}$ " grounds and $1\frac{1}{2}$ " wide fine-mesh expanded flanges. Nailed to framing through panels or stapled to panels. Provides superior key for joint compounds and eliminates shadowing and edge cracking.



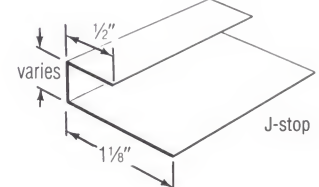
SHEETROCK Metal Trims

Provide protection and neat finished edges to gypsum panels at window and door jambs, ceiling angles and intersections where panels abut other materials. Nailed through the channel and panels into the framing or jamb. Eliminate precision cutting and mitering. Finished with joint compounds (except 400). Made in following types:



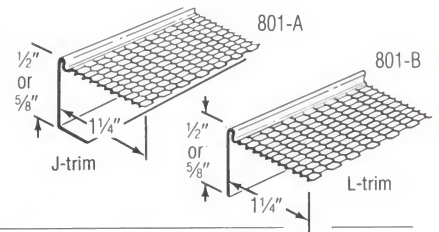
SHEETROCK L-Trim & J-Trim

Galvanized steel casing, includes No. 200-A J-shaped channel in $\frac{1}{2}$ " and $\frac{5}{8}$ " sizes; No. 200-B L-shaped angle edge trim without back flange to simplify application, in $\frac{1}{2}$ " and $\frac{5}{8}$ " sizes.



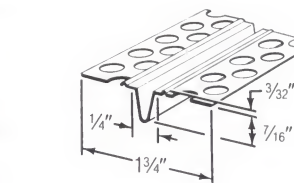
SHEETROCK J-Stop

Reveal type galvanized steel trim, requires no finishing compound, includes No. 400 in $\frac{3}{4}$ " size, No. 401 in $\frac{1}{2}$ ", No. 402 in $\frac{5}{8}$ " size.



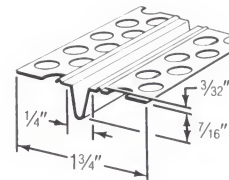
SHEETROCK Expanded Flange L-Trim & J-Trim

Expanded-flange trim used to provide edge protection at cased openings and ceilings or wall intersections. Includes 801-A J-shaped and 801-B L-shaped trim, both in $\frac{1}{2}$ " and $\frac{5}{8}$ " sizes.



SHEETROCK Zinc Control Joint No. 093

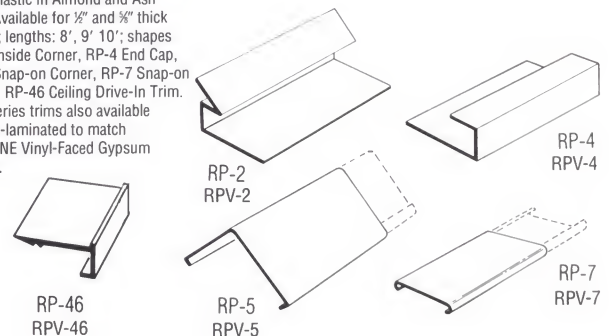
Relieves stresses of expansion and contraction across the joint in large ceiling and wall areas. Made from roll-formed zinc with a tape-protected $\frac{1}{4}$ " opening $\frac{1}{8}$ " deep. Length: 10'. Limitation: where sound and/or fire ratings are prime considerations, an adequate seal must be provided behind the control joint.



Plastic Trim Accessories

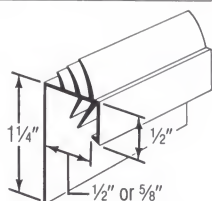
USG Rigid Vinyl Trim (RP Series)

Vinyl plastic in Almond and Ash Blue. Available for $\frac{1}{2}$ " and $\frac{5}{8}$ " thick panels; lengths: 8', 9', 10'; shapes RP-2 Inside Corner, RP-4 End Cap, RP-5 Snap-on Corner, RP-7 Snap-on Batten, RP-46 Ceiling Drive-In Trim. RPV series trims also available factory-laminated to match TEXTONE Vinyl-Faced Gypsum Panels.



USG P-1 Vinyl Trim

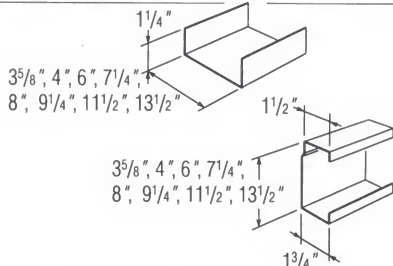
Reveal type, white plastic trim with flanges and web of rigid vinyl and integral flexible vinyl fins that compress on installation. Fins form permanent flexible seal to effectively block sound, replace caulking, provide structural stress relief at panel perimeter. Requires no finishing compound; includes P-1A in $\frac{3}{8}$ " size, P-1B in $\frac{5}{8}$ " size.



Metal Framing Members

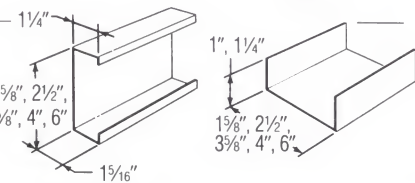
Steel SJ-Studs and CR-Runners

Channel-shaped structural framing members; roll-formed, with corrosion-resistant coating. Widths: $3\frac{5}{8}$ ", 4", 6", $7\frac{1}{4}$ ", 8", $9\frac{1}{4}$ " 11 $\frac{1}{2}$ " and 13 $\frac{1}{2}$ "; stud styles: SJ20, SJ18, SJ16, SJ14. Stud lengths: as required. Runners come in stud widths, 10' length only.



Steel ST-Studs and CR-Runners

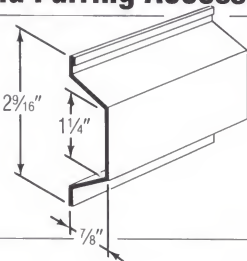
Channel-shaped non-loadbearing framing members; roll-formed, with corrosion-resistant coating. Stud widths: 1 $\frac{5}{8}$ " (for ST25 only), 2 $\frac{1}{2}$ ", 3 $\frac{5}{8}$ ", 4", 6". Stud styles: ST25, ST22, ST20. Stud lengths: 8' to 16'. Runners come in stud widths, 10' length only.



Metal Channels and Furring Accessories

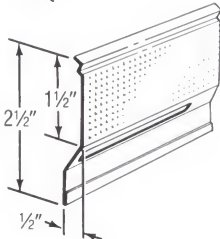
Metal Furring Channels

Hat-shaped channels for ceiling and wall furring. Roll-formed from two gauges of corrosion-resistant steel. DWG-25 for screw attachment of $\frac{1}{2}$ " and $\frac{3}{8}$ " gypsum panels. DWG-20 for greater spans and load-carrying capacity in ceiling applications. Products comply with ASTM C645. Face width: 1 $\frac{1}{4}$ "; depth: $\frac{3}{4}$ "; length: 12'.



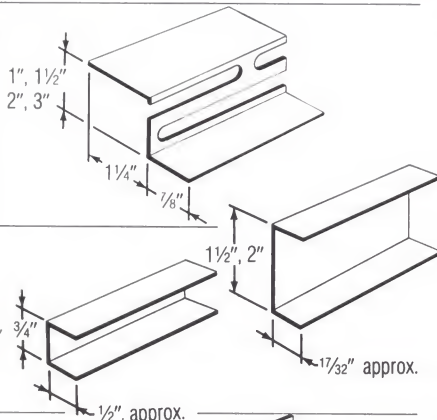
RC-1 Resilient Channel

Part of the family of SHEETROCK Metal Products. Corrosion-resistant steel channel for resilient attachment of gypsum panels to wood and steel framing. Reduces sound transmission through wood and steel framed partition and floor-ceiling assemblies. Width: 2 $\frac{1}{2}$ "; depth: $\frac{1}{2}$ "; length: 12'. Limitation: not for use beneath highly flexible floor joists; should be attached to walls or ceilings with 1 $\frac{1}{4}$ " coarse thread or drywall steel screws; not suitable for use with more than 2 layers $\frac{5}{8}$ " thick gypsum panels.



SHEETROCK Z-Furring Channels

Mechanically attach THERMAFIBER, mineral and rigid foam insulations and SHEETROCK brand Gypsum Panels to interior surfaces of monolithic concrete and masonry walls. Also for attaching insulation and gypsum panels to interiors of existing walls and ceilings. Made of corrosion-resistant steel; furring depths: 1", 1 $\frac{1}{2}$ ", 2", 3"; length: 8' 6".

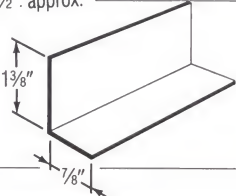


Cold-Rolled Channels

Made of 16-ga. steel, used for furring and in suspended ceilings and partitions. Available either galvanized or black asphaltum painted. Sizes: $\frac{3}{4}$ ", with $\frac{1}{8}$ " flange; 1 $\frac{1}{2}$ " and 2" with $\frac{1}{2}$ " flange. Length: 16' and 20'.

Metal Angles

1 $\frac{1}{2}$ " x $\frac{3}{8}$ " corrosion-resistant steel angle sections used as runners to secure and brace 1" coreboard in laminated gypsum partitions. 2 $\frac{1}{2}$ " x 2 $\frac{1}{2}$ " size made for High Attenuation Double Wall Systems. Length: 10'.



Metal Furring Channel Clips

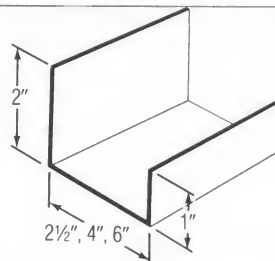
Made of galvanized wire for attaching DWG-25 Metal Furring Channels to 1 $\frac{1}{2}$ " cold-rolled channels. Installed on alternate sides of carrying channels; where clips cannot be alternated, wire tying recommended.



Shaft Wall Framing Members

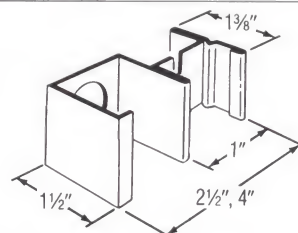
USG Steel J-Runners

Used at floor and ceiling in shaft wall assemblies and for special stud framing, made with unequal legs in 2 $\frac{1}{2}$ ", 4" and 6" widths; styles: 212JR24, 212JR20, 400JR24, 400JR20, 600JR24, 600JR20; length: 10'.



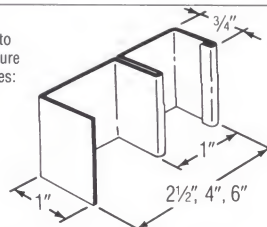
USG Steel C-H Studs

Rigid, roll-formed sections for cavity shaft walls shaped to engage 1" liner panels. Widths: 2 $\frac{1}{2}$ " and 4"; styles: 212CH25, 212CH22, 212CH20, 400CH25, 400CH20; lengths as required.



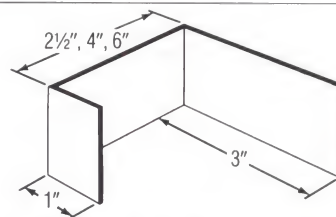
USG Steel E-Studs

Used singly for cavity shaft walls to cap partition or both sides of closure panel; widths: 2 $\frac{1}{2}$ ", 4" and 6"; styles: 212ES25, 212ES20, 400ES25, 400ES20, 600ES25, 600ES20; lengths as required.



USG Steel Jamb Struts

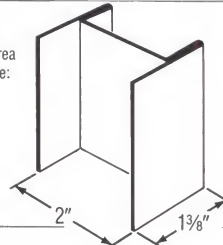
Used in jamb framing for fire-rated shaft wall elevator door frames. Widths: 2 $\frac{1}{2}$ ", 4" and 6"; style: 212JS20, 400JS20, 600JS20; length: 10'.



Area Separation Fire Wall/Party Wall Framing Members

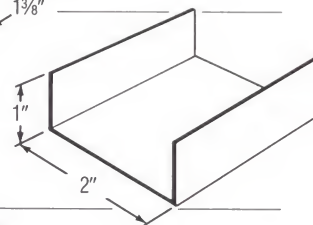
USG Steel H-Studs

Slide over and engage edges of adjacent liner panels for solid area separation walls. Width: 2"; style: 200HS25; length: 8' to 16'.



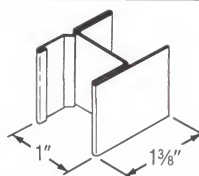
USG Steel CR-Runners

For solid area separation walls: 2" width, style 200CR25, 10' length.



USG H-Spline

Roll-formed from 20-ga. steel for high-performance drywall partition systems. Slides over and engages edges of adjacent 1" gypsum liner panels. Width: 1"; length: 8' to 12'.



Screws

SUPER-TITE Screws are high quality, economical screws for interior framing applications. These self-drilling, self-tapping steel screws have specially designed drill point and threads to ensure fast penetration into steel and wood framing. Meet ASTM C1002. Sizes available: 1", 1½", 1¾", 1⅝", 2", 2¼", 2½", 3" Bugle Head for attaching gypsum panels to 20- and 25-ga. steel framing; 1¼" W Bugle Head for attaching panels to wood framing; ⅝" Pan Head Screws for securing 20- and 25-ga. studs to runners. **SUPER-TITE II Screws**, having alternate high and low threads, are available in the same sizes as SUPER-TITE Bugle Head Screws. **SUPER-TITE DRILLERS Screws** have sharp drilling flutes capable of penetrating 14-ga. steel. Meet ASTM C954. Self-drilling Bugle Head Screws in 1", 1½", 1¾", 1⅝", 1⅞", 2⅝", 2⅞" and 3" sizes are used for attaching gypsum panels to steel framing up to 14-ga. DRILLERS also come in ⅝" Pan Head Screw for anchoring up to 14-ga. studs to runners.

BUILDEX Screws are aimed at producing the best possible attachments of SHEETROCK brand Gypsum Panels. Their development not only has improved installation methods but has made possible today's broad selection of drywall systems applied over steel framing. Screws must be used with such systems. Type S meets ASTM C1002; Type S-12 meets ASTM C954.

Insulation

THERMAFIBER Insulation is a mineral fiber product ideal for improving sound control in partition and floor-ceiling constructions.

Sound Attenuation Fire Blankets (SAFB) are a paperless, semi-rigid mineral fiber mat designed to improve STC ratings when installed in steel stud partitions and wood-frame construction. Fire-resistant Fire Safety FS-15 Blankets are used to provide noncombustible exterior wall furring and steel stud curtain wall assemblies. They are open-faced and require separate vapor retarder (see Folder SA-707).

Adhesives and Acoustical Sealant

Drywall Adhesives make an important contribution to gypsum panel attachment where the finest room interiors are desired. Their use greatly reduces the nail or screw fastening otherwise required, thus saves labor on spotting and sanding—also minimizes nail pops and other fastener imperfections.

Recommended for laminating gypsum panels in multi-layer fire-rated or non-rated partitions and ceilings are **SHEETROCK Setting-Type (DURABOND)** or **Lightweight Setting-Type (EASY SAND) Joint Compounds**—dry powder products, applied by spreader, requiring mixing and temporary fastening in application or **SHEETROCK All Purpose or Taping Joint Compound Ready-Mixed**. These compounds provide tight bond when dry yet permit adjustment of panels after contact.

Recommended adhesives for non-fire-rated construction are a solvent-based stud adhesive which meets ASTM C557 and is compatible with vinyl or vinyl-faced gypsum panels, or a rubber-based construction adhesive for subfloors and plywood construction which meets ASTM C557 and American Plywood Association Performance Standard AFG-01. Laminating and liquid contact adhesives are also commercially available. These adhesives bridge minor irregularities in the base or framing, make it easier to form true joints and level surfaces. The use of stud adhesives add strength to an assembly, reduce fasteners required, help eliminate loose panels and nail pops. Adhesives should not contain acetone, heptane, hexane, toluene or xylene.

SHEETROCK Acoustical Sealant is a highly elastic, water-base caulking for sound-rated partition and ceiling systems and sealing exterior walls to reduce infiltration. Non-bleeding and staining, pumpable and easily applied in beads. Provides excellent adherence

to most surfaces, permanent flexibility and lasting seal. Flame spread 5, smoke developed 0. Complies with ASTM C919.

USG Fire Stop System for Floor and Wall Penetrations

FIRECODE Compound is a compound developed to provide floor and wall through-penetration firestop systems that combine exceptional economy and performance. Effectively seals openings around pipe and cable poke-through openings, blocking particulate, fire, sound, smoke and air movement. Meets ASTM E814 and UL 1479 in tests conducted at Underwriters Laboratories. Thirteen different UL classified through-penetration systems are available: WL-1039, WL-2036, WL-3034 and WL-7001, 1-hr. fire-rated wall systems; WL-1027, WL-1063, WL-1065, WL-2023, WL-3032 and WL-7002, 2-hr. fire-rated wall systems; and CAJ-0032, CAJ-1081 and CAJ-3045, 3-hr. fire-rated floor/wall systems. Refer to SA-727 for information on the USG Fire Stop System for Floor and Wall Penetrations.

Joint Treatment Systems

Today's complete United States Gypsum Company joint treatment line includes both ready-mixed and powder products in drying and setting types. All are formulated without asbestos to meet OSHA and Consumer Product Safety standards pertaining to asbestos. In addition to conventional joint finishing and fastener spotting, certain products are designed for repairing cracks, patching, spackling, back-blocking, texturing and for laminating gypsum panels in double-layer systems. These joint compounds meet ASTM C475.

For estimating purposes: for 1,000 sq. ft. of surface area to be finished, approximately 370 lin. ft. of tape and 83 lb. of conventional drying-type powders, 67 lb. of lightweight drying-type powders, 72 lb. of conventional setting-type powders, 52 lb. of lightweight setting-type powders, 138 lb. of conventional weight ready-mixed type or 9.4 gallons of lightweight ready-mixed joint compound are required

Joint Treatment Limitations

- 1 United States Gypsum Company joint compounds are not compatible with and should not be intermixed with any other compounds.
- 2 For interior use only—except SHEETROCK Setting-Type (DURABOND) and Lightweight Setting-Type (EASY SAND) Joint Compounds; not recommended for laminating—except SHEETROCK Setting-Type (DURABOND) and Lightweight Setting-Type (EASY SAND) Joint Compounds, and SHEETROCK All Purpose and Taping Joint Compounds Ready-Mixed.
- 3 Protect bagged and cartoned products against wetting; protect ready-mixed products from freezing and extreme heat.
- 4 Each compound coat must be dry before the next is applied—except SHEETROCK Setting-Type (DURABOND) and Lightweight Setting-Type (EASY SAND) Joint Compounds—and completed joint treatment must be thoroughly dry before decorating.
- 5 Only SHEETROCK Setting-Type (DURABOND) and Lightweight Setting-Type (EASY SAND) Joint Compounds are recommended for treating joints of SHEETROCK brand Gypsum Panels, Water-Resistant, to be covered with ceramic or plastic tile (do not use other compounds).

Joint Tapes

SHEETROCK Joint Tape is a strong, cross-fibered paper tape with minimal longitudinal stretch and superior tensile strength. Lightly pre-creased for corner application.

SHEETROCK Fiberglass Drywall Tape is made with a unique cross-fiberglass construction to provide greater drywall joint strength than

conventional fiberglass leno-weave mesh tapes. Self-adhesive tape goes on quickly—eliminates bedding coat and provides smooth finished joints in only two coats. For first coat over tape, setting-type joint compound is used; for second coat, setting-type or drying-type (ready-mixed or powder) joint compounds may be used. Tape is also ideal for patching small holes and cracks.

Ready-Mixed Compounds

SHEETROCK Ready-Mixed Joint Compounds are non-asbestos, vinyl-based formulations specially premixed to a creamy, smooth consistency. They offer excellent slip and bond, easy workability. Joint finishing is fast, easy and smooth, reducing labor costs and improving appearance and quality of the job. Meet ASTM C475.

Limitation: protect wet joints and container from freezing.

SHEETROCK Taping Joint Compound Ready-Mixed is a high-performance product for embedding tape and is also used for laminating.

SHEETROCK Topping Joint Compound Ready-Mixed is a low-shrinkage, easily applied and sanded product recommended for second and third coats over ready-mixed taping and all purpose compounds. Also used for simple hand-applied texturing or skim coating in some markets; check suitability of formula in your area with local sales office. Not suitable for embedding tape or as first coat over metal corners, trim and fasteners.

SHEETROCK All Purpose Joint Compound Ready-Mixed used for embedding, finishing, simple hand-applied texturing, laminating and skim coating. Combines single package convenience with good taping and topping characteristics. Recommended for repairing cracks in interior plaster and masonry not subject to moisture.

SHEETROCK Lightweight All Purpose Joint Compound Ready-Mixed (PLUS 3) offers all benefits of a conventional product. Exclusive advantages: weighs up to 35% less, requires only two coats over metal bead and fasteners, gives exceptional ease of sanding. This all purpose, single package product provides tight bond, superior slip and workability, good crack resistance and low shrinkage. Also used for simple hand-applied texturing.

Vinyl-Base Powder Joint Compounds

SHEETROCK Powder Joint Compounds are top-quality, non-asbestos, conventionally drying-type products providing easy mixing, smooth application and ample working time. Designed for embedding tape, for fill coats and finishing over drywall joints, corner bead, trim and fasteners. Also used for simple texture finishes for decorating variety. Meet ASTM C475.

SHEETROCK Taping Joint Compound is for embedding tape and for first fill coat on metal beads, trim, fasteners; also for patching plaster cracks. Outstanding bond and resistance to tape cracking.

SHEETROCK Topping Joint Compound is a smooth-sanding material for second and third coats over taping compound or all purpose compound. Produces excellent feathering and superior finishing.

SHEETROCK All Purpose Joint Compound incorporates good taping and topping characteristics in a single product. For use where finest results of the specialized compounds (above) are not necessary. Also has good hard-texturing properties.

SHEETROCK Lightweight All Purpose Joint Compound (AP LITE) weighs 20% less than conventional compounds; offers lower shrinkage, better crack resistance, easier mixing, application and sanding.

SHEETROCK Setting-Type (DURABOND) and Lightweight Setting-Type (EASY SAND) Joint Compounds

These setting-type powder products were developed to provide faster finishing of drywall interiors, even under slow drying conditions. Rapid chemical hardening and low shrinkage permit

same-day finishing and usually next-day decoration. Features exceptional bond; virtually unaffected by humidity extremes. Ideal for laminating double-layer systems, particularly fire-rated assemblies, and for adhering gypsum panels to above-grade concrete surfaces. May be used for skim coating and surface texturing and for filling, smoothing and finishing interior above-grade concrete. Also used to treat joints in exterior gypsum ceiling board and to embed tape and fill beads in veneer finish systems when any of the following conditions exist: rapid drying conditions due to low humidity, high temperature and excessive evaporation; metal framing is specified; 24" o.c. wood frame spacing and a single layer gypsum base veneer system is specified ($\frac{3}{8}$ " base with one-coat veneer finish and $\frac{1}{2}$ " or $\frac{5}{8}$ " base with two-coat veneer finish). Required as prefill material for SHEETROCK brand Gypsum Panels, SW Edge. Recommended for filling joints of SHEETROCK brand Gypsum Panels, Water-Resistant, and treating fastener heads in areas to receive ceramic or plastic tile. Also used extensively for touch-up and patching. **Limitations:** SHEETROCK Setting-Type Joint Compounds (DURABOND) are difficult to sand after drying and must be smoothed before complete setting. Not to be applied over moist surfaces or surfaces likely to become moist, on below-grade surfaces, or on surfaces subject to moisture exposure, pitting or popping.

SHEETROCK Setting-Type Joint Compound (DURABOND) In addition to the above applications, these compounds are also ideal for repairing surface damaged areas in handball and racquetball court walls finished with STRUCTO-BASE and STRUCTO-GAUGE Gypsum Plasters. Also use for repair of STRUCTOCORE Security Wall system. Offers varied setting times of 20 to 30 min., 30 to 80 min., 85-130 min., 180-240 min. and 240 to 360 min.

SHEETROCK Lightweight Setting-Type Joint Compound (EASY SAND) weighs 25% less than conventional setting-type compounds for easier handling, faster application and improved productivity on the job. Provides sanding ease similar to a ready-mixed, all purpose joint compound. Offers varied setting times of 20 to 30 min., 30 to 80 min., 85 to 130 min., 180 to 240 min. and 240 to 360 min.

Prime Coat

SHEETROCK First Coat is a flat latex basecoat paint formulated to provide a superior first (prime) coat over interior gypsum board and concrete surfaces. Equalizes differences between the porosity and texture variations of gypsum board face paper and finished joint compound to minimize decorating problems such as "joint banding." Applies with brush, roller or spray equipment. Dries to a white finish in less than 30 minutes; topcoat within an hour. Not intended as a final coating—should be overpainted when dry. Available ready-mixed or in powder form—mixed with water at jobsite.

Concrete Finishing Compound

COVER COAT Compound is a vinyl-base product, designed for filling and smoothing monolithic concrete ceilings and columns located above grade—no extra bonding agent needed. Supplied in ready-mixed form (sand can be added), easily applied with drywall tools in two or more coats. Dries to a fine white surface usually making further decoration unnecessary on ceilings. **Limitations:** not to be applied over moist surfaces or surfaces likely to become moist (by condensation or otherwise); on ceiling areas below grade; on surfaces which project outside the building, or on other areas which might be subject to moisture, freezing, efflorescence, pitting or popping. Not washable unpainted.

Texture Finishes

United States Gypsum Company also produces the industry's broadest line of texture finishes to provide distinctive appearance and surface decoration to gypsum panel walls and ceilings. A full line of both ready-to-use and powder products is offered to create fine, medium or coarse textures, sand or simulated acoustical finishes and interesting spatter, spatter/knockdown, "orange peel" or light to medium stipples. For available texture products, often applied by the same trade which finishes gypsum drywall, refer to *Texture and Finish Products Folder SA-933*.

Wood Framing Requirements

- 1 Framework should meet the minimum requirements of local building codes.
- 2 Framing members should be straight, true, of uniform dimension, and framing should be properly aligned.
- 3 All framing lumber should be of a good grade for the intended use, and 2"x4" nominal size or larger should bear the grade mark of a recognized inspection agency.
- 4 All framing lumber should have a moisture content not in excess of 19% at time of gypsum panel application.
- 5 Do not attach panels to extremely soft framing members.

Failure to observe these minimum framing requirements, which are applicable to screw, nail and adhesive attachment, will materially increase the possibility of fastener failure and surface distortion, due to warping or dimensional changes.

Framing should approach as closely as possible the moisture content it will reach in service by allowing the building, after it is enclosed, to stand as long as possible prior to the application of the gypsum panels.

Good Design Practices

- 1 **Specifications**—The following comments and recommendations cover basic specifications for normal job requirements and are intended as minimum guide specifications which can be adapted to specific projects and conditions. These specifications are not intended to cover every possible design or job condition, but rather to assist in preparation of specifications.
- 2 **Related Systems**—Description, details and specifications on various systems are covered in these pertinent USG Corporation folders:
 - SA-700 USG Exterior Products & Systems
 - SA-707 THERMAFIBER Life-Safety Fire Containment Systems
 - SA-727 USG Fire Stop System for Floor and Wall Penetrations
 - SA-923 Drywall/Steel Framed Systems
 - SA-924 Drywall/Wood Framed Systems
 - SA-925 USG Area Separation Fire/Party Wall Systems
 - SA-926 USG Cavity Shaft Wall Systems
 - SA-932 DUROCK Cement Board Systems
 - SA-933 Texture and Finish Products
- 3 **Protection**—Light gauge metal components such as steel studs and runners, furring channels and resilient channels should be given adequate protection in the warehouse and on the jobsite against rusting caused by moisture. In marine areas such as the Caribbean, Florida and the Gulf Coast where chloride as well as sea salt is present in combination with excessively high humidity, use of components which offer increased protection against corrosion is recommended.
- 4 **Shadowing and Spotting**—Temperature differentials on the interior surface of exterior walls may result in collection of airborne dirt on the colder surface areas. Consequently accumulated dirt in the form of shadowing and spotting may occur at locations of fasteners or framing where surface temperatures usually are lowest. This is a natural phenomenon which occurs through no fault of the products.

Where temperature, humidity and soiling conditions are expected to cause objectionable shadowing and spotting, one of the following alternatives should be considered:

- A The interior facing of SHEETROCK brand Gypsum Panels, Foil-Back, should be furred from the exterior wall studs using a base layer of panels screw-attached to the studs and horizontally applied metal furring channels spaced 24" o.c.
 - B On exterior masonry walls, install rigid or semi-rigid insulation between SHEETROCK Z-Furring Channels affixed to the interior side of wall and finish with SHEETROCK brand Gypsum Panels, Foil-Back.
 - C For maximum resistance to shadowing and spotting, a separate free-standing wall construction is recommended using studs that are independent of the exterior wall.
- 5 **Painting Systems**—For satisfactory results, painting products and systems should be used which comply with recommendations and requirements in Appendixes of ASTM C840.

For priming and decorating with paint, texture or wall covering, follow manufacturer's directions for materials used. All surfaces, including applied joint compound, must be thoroughly dry, dust-free, and not glossy. Prime with SHEETROCK First Coat or with an undiluted, interior latex flat paint with high-solid content. Allow to dry before decorating.

To improve fastener concealment, where gypsum panel walls and ceilings will be subjected to severe artificial or natural side lighting and be decorated with a gloss paint (egg shell, semi-gloss or gloss), the gypsum panel surface should be skim coated with joint compound to equalize suction and texture differences between the drywall face paper and the finished joint compound before painting.

- 6 **Note**—United States Gypsum Company reserves the right to make changes or improvements in the design of all cataloged items without notice and without obligation to incorporate these changes or improvements in items already manufactured.
- 7 **Additional Information**—See United States Gypsum Company technical folders in this series and in Sweet's General Building File. See *UN-30 UNIMAST Steel Framing Systems: Technical Information* for data on steel products.

Architectural Specifications

Part 1: General

1.1 **Scope**—Specify to meet project requirements.

1.2 Qualifications

All material described in this Folder manufactured by or for United States Gypsum Company shall be installed in accordance with its current printed directions.

All studs, runners and other accessories identified as USG or SHEETROCK products in this catalog are marketed by United States Gypsum Company as integral components of our gypsum board systems. Upon request United States Gypsum Company will provide certification that these products conform to the applicable Company and ASTM standards as well as meet the performance values identified herein.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Environmental Conditions

In cold weather and during gypsum panel joint finishing, temperatures within the building shall be maintained within the range of 55° to 70°F (13° to 21°C). Adequate ventilation shall be provided to carry off excess moisture.

Part 2: Products

2.1 Materials

A Interior Panels

- Gypsum Panels (in lengths as long as practical to minimize number of joints):
SHEETROCK brand (Regular, SW Edge, FIRECODE Core, FIRECODE C Core, ULTRACODE Core) Gypsum Panels (thickness).
SHEETROCK brand Foil-Back (Regular, SW Edge, FIRECODE Core, FIRECODE C Core) Gypsum Panels (thickness).
SHEETROCK brand Water-Resistant (Regular, FIRECODE Core, FIRECODE C Core) Gypsum Panels (thickness).
TEXTONE Vinyl-Faced Gypsum Panels (type) (pattern) (thickness).
—Gypsum Coreboard: SHEETROCK brand Gypsum (Coreboard) (Liner Panel) (length).
—Interior Ceiling Board: SHEETROCK brand Interior Gypsum Ceiling Board (length).

B Exterior Panels

- Gypsum Sheathing: (SHEETROCK brand Gypsum Sheathing, GYP-LAP Gypsum Sheathing) (FIRECODE) (size) (thickness).
—Exterior Ceiling Board: SHEETROCK brand Exterior Gypsum Ceiling Board (thickness).

C Interior Steel Framing

- Steel Studs: 158ST25 (1½"), 212ST25 (2½"), 358ST25 (3¾"), 400ST25 (4"), 600ST25 (6"), 212ST22 (2½"), 358ST22 (3¾"), 400ST22 (4"), 600ST22 (6"), 212ST20 (2½"), 358ST20 (3¾"), 400ST20 (4"), 600ST20 (6").
—Steel Runners: 158CR25 (1½"), 212CR25 (2½"), 358CR25 (3¾"), 400CR25 (4"), 600CR25 (6"), 212CR22 (2½"), 358CR22 (3¾"), 400CR22 (4"), 600CR22 (6"), 362CR20 (3¾"), 400CR20 (4").

D Exterior Steel Framing

- SJ Style Studs: 362SJ20 (3¾"), 362SJ18 (3¾"), 362SJ16 (3¾"), 362SJ14 (3¾"), 40SJ20 (4"), 40SJ18 (4"), 40SJ16 (4"), 40SJ14 (4"), 60SJ20 (6"), 60SJ18 (6"), 60SJ16 (6"), 60SJ14 (6"), 725SJ18 (7¼"), 725SJ16 (7¼"), 725SJ14 (7¼"), 80SJ18 (8"), 80SJ16 (8"), 80SJ14 (8").
—Runners: Select CR-runner to match stud style.

E USG Cavity Shaft Wall & Area Separation Fire/Party Wall

- Cavity-Type Area Separation Wall Materials: USG Steel CR-Runners (style), USG Steel C-H Studs and E-Studs (style), USG Aluminum Breakaway Clip.
—Cavity Shaft Wall Materials: USG Steel J-Runners (style), USG Steel C-H Studs (style), USG Steel E-Studs (style), USG Steel Jamb Struts (style).
—Solid-Type Area Separation Wall Materials: USG Steel CR-Runners (style), USG Steel H-Studs (style), USG Aluminum Breakaway Clip.

F Furring Accessories

- Metal Furring Materials: (Metal Furring Channels and Clips) (Adjustable Wall Furring Brackets) (Cold-Rolled Channels ¾" or 1½") (SHEETROCK Z-Furring Channels).
—Resilient Channels: RC-1 Resilient Channel.

G Fasteners

- Drywall Screws: size: (¾")(⅞")(½")(1")(1¼")(1½")(1¾")(2") (2¼")(2½")(3") style: (framing—Type S or S-12) (drywall—Type S) (self-drilling—Type S-12) (laminating—Type G) (coarse thread—Type W) head: (bugle) (pan) (trim) (pancake) (low-profile) (mod. truss head) coating: (reg) (corrosion-resistant).
—Drywall Nails: (length) (type) (conforming with ASTM C514) (as specified in fire-resistive construction).

H Adhesives

- Drywall Adhesives: (SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound 210 or

90) (SHEETROCK All Purpose or Taping Joint Compound Ready-Mixed).

I Insulation

- THERMAFIBER Sound Attenuation Fire Blankets (thickness)(width).
—THERMAFIBER Commercial Insulation Blankets (thickness)(width).

J Trim Accessories

- Corner Angles: Metal Angles, 2½"x2½"x24-ga. corrosion-resistant steel, lengths as required.
—Corner Reinforcement: (DUR-A-BEAD Corner Bead No. 103, 104) (SHEETROCK No. 800).
—Metal Trim: SHEETROCK Metal Trim No. (200-A ½" or ⅝", 200-B ½" or ⅝", 400, 401 or 402, 801-A ½" or ⅝", 801-B ½" or ⅝").
—Control Joint: SHEETROCK Zinc Control Joint No. 093.

K Plastic Trim Mouldings

- Plastic Trim: USG (P-1) (RP or RPV Series), Vinyl Trim.

L Finishing Products

- Joint Treatment: SHEETROCK Joint Tape. SHEETROCK Fiberglass Drywall Tape (must use a setting-type joint compound for first coat over tape). SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound (20, 45, 90, 210, 300). SHEETROCK Joint Compound (Taping, Topping, All Purpose). SHEETROCK Lightweight All Purpose Joint Compound (AP LITE). SHEETROCK Ready-Mixed Joint Compound (Taping, Topping, All Purpose). SHEETROCK Lightweight All Purpose Joint Compound Ready-Mixed (PLUS 3).
—Concrete Finishing Compound: (SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound) (COVER COAT Compound) (as ready-mixed) (with sand additive).

M Firestop

- Firestop: FIRECODE Compound.

N Acoustical Sealant

- Sealant: SHEETROCK Acoustical Sealant.

O Decorating

- Prime Coat: SHEETROCK First Coat.

Part 3: Execution

3.1 Gypsum Panel Application

3.1.1 Basic Single-Layer System, Treated Joints

- A** Position all ends and edges of all gypsum panels over framing members, except when joints are at right angles to framing members as in perpendicular application or when end joints are backblocked.
- B** Apply gypsum panels first to the ceiling and then to the walls. Extend ceiling board into corners and make firm contact with top plate. To minimize end joints, use panels of maximum practical lengths. Fit ends and edges closely, but not forced together. Stagger end joints in successive courses with joints on opposite sides of a partition placed on different studs.
- C** Attach panels to framing supports by: (Standard Single Nailing Method) (Adhesive Application) (Double Nailing Method) (Power-driven Screws). Space fasteners not less than ¾" from edges and ends of panels and drive as recommended for specified fastening method. Drive fasteners in field of panels first, working toward ends and edges. Hold panel in firm contact with framing while driving fasteners. Drive fastener heads slightly below surface of gypsum panels in a uniform dimple without breaking face paper.
- D** Cut ends, edges, scribe or make cutouts within field of panels in a workmanlike manner. Gypsum board should be cut to size utilizing a knife and a straight edge. A power saw should be used only if it is equipped with a dust collection device.

- E** Install trim at all internal and external angles formed by the intersection of either panel surfaces or other surfaces. Apply corner bead to all vertical or horizontal external corners in accordance with manufacturer's directions. (Multilayer systems: see pertinent United States Gypsum Company System Folders.)

3.1.2 SHEETROCK brand Gypsum Panels, Water-Resistant—(see United States Gypsum Company Folder SA-924.)

3.1.3 Lamination of Gypsum Panels to Interior Monolithic Concrete and Unit Masonry

- A** The masonry or concrete shall be clean, smooth and dry prior to application. If wood base is to be used, attach wood nailer to wall before lamination is started.
- B** Cut face panels to allow continuous clearance ($\frac{1}{8}$ " to $\frac{1}{4}$ ") at floor. Apply SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound, or SHEETROCK All Purpose or Taping Joint Compound Ready-Mixed at center and near each panel edge in strips consisting of 4 beads, $\frac{3}{8}$ " wide x $\frac{1}{2}$ " high and spaced $1\frac{1}{2}$ " to 2" o.c. Position panels vertically over wall surface, press into place and provide temporary support until adhesive is hardened.
- C** Install trim at all intersections of panel surfaces with other surfaces.
- D** Lamination to interiors below grade or directly to interior surfaces of exterior walls, and lamination where exposure to moisture is extreme or continuous, are not recommended.

3.2 RC-1 Resilient Channel Erection

(See specifications in Systems Folders SA-923 and SA-924.)

3.3 Steel Stud and Runner Erection

(See specifications in Systems Folder SA-923.)

3.4 Metal Furring Channel Erection

(See specifications in Systems Folder SA-923.)

3.5 USG High Performance Floor/Ceiling Erection

(See specifications in Systems Folder SA-924.)

3.6 USG Area Separation Wall Erection

(See specifications in Systems Folder SA-925.)

3.7 USG Cavity Shaft Wall Erection

(See specifications in Systems Folder SA-926.)

3.8 Control Joint Installation

Attach SHEETROCK Zinc Control Joint No. 093 with Bostitch $\frac{5}{16}$ " "G" staples or equal spaced not over 6" apart in each flange. Cut end joints square and align for neat fit. Remove protective tape when joint treatment is completed.

3.9 Fastener and Adhesive Application

3.9.1 Drywall Screws

Power-drive with an electric screwdriver so screwheads provide a slight depression below surface of gypsum panels without breaking face paper. Do not drive screws closer than $\frac{3}{8}$ " from edges and ends of gypsum panels.

3.9.2 Nails

Drive nails with heads slightly below gypsum panel surface in a uniform dimple $\frac{1}{32}$ " deep formed by crowned face of hammer. Drive nails no closer than $\frac{3}{8}$ " from edges and ends of panel.

3.9.3 Adhesive

Mix and apply in accordance with manufacturer's directions, and as follows:

- A** Apply SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound in the prescribed manner to back of face panels to be laminated. Laminate face panels to (base layer panels) (coreboard) using moderate pressure and temporary nailing or shoring to ensure adequate bond.
- B** Apply stud adhesive in a continuous $\frac{3}{8}$ " bead at center of attachment to face of framing members. Where two gypsum panels meet on a framing member, apply two parallel beads on face of framing at panel joints. Do not apply adhesive to

members such as bridging, diagonal bracing, etc., into which no supplemental fasteners will be driven. Immediately following contact of panel to adhesive, apply necessary fasteners 16" o.c. around perimeter of panel, $\frac{3}{8}$ " away from edges and ends. On ceilings only, apply one temporary field fastener per framing member at mid-width of board; remove after 24 hours. With predecorated panels pre-bowed and applied vertically, use permanent fasteners only at top and bottom of panel.

- C** Apply laminating adhesive in strips to center and along both edges of gypsum face panel. Apply strips with a notched metal spreader having four $\frac{1}{4}$ "x $\frac{1}{4}$ " minimum notches spaced max. of 2" o.c. Position face panels against base panels; fasten at top and bottom (vertical application) as required. For laminated ceilings, space fasteners 16" o.c. along edges and ends, with one permanent field fastener per framing member installed at mid-width of panel. Press panel into place with firm pressure to ensure bond; press again within 24 hr. if necessary.
- D** Apply liquid contact adhesive with a short nap paint roller to cover both contact surfaces according to adhesive manufacturer's directions. Let adhesive air dry to the touch. Apply panels as soon as possible after drying occurs. On walls, fasten 16" o.c. at top and bottom (vertical application) as required. In ceiling lamination, apply permanent supplementary fasteners at each corner of panel, and along edges spaced max. 48" o.c. Press panel into place with firm pressure to ensure bond.
- E** Apply construction adhesive in continuous $\frac{3}{8}$ " beads to framing. On walls, apply a continuous adhesive bead to center of studs to within 6" of board perimeter. At panel joints, apply two adhesive beads—one at a time—as each panel is installed. Do not apply adhesive at inside corners or to top and bottom plates, bridging, bracing and fire stops. Apply no more adhesive than can be covered in 15 min. Set panel in place, fasten 16" o.c. along top and bottom of panel and impact by hand along stud.

3.10 Pre-Fill Application

- A** Mix SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound according to directions on bag. Do not overmix, or use extremely cold water or cold joint compound.
- B** Pre-fill all "V"-grooves formed by abutting tapered eased edges of SHEETROCK brand Gypsum Panels, SW Edge, with SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound using a flexible 5" or 6" joint finishing knife or Ames Pre-Fill Tool. Fill "V" joint flush and wipe off excess compound beyond the "V" groove, leaving a clear depression to receive tape. Allow pre-fill to harden prior to the next application (tape or embedding coat).

3.11 Joint Treatment Application

3.11.1 SHEETROCK Joint Tape

- A** Mix joint compound in strict accordance with manufacturer's recommendations.
- B** Apply joint compound in a thin uniform layer to all joints and angles to be reinforced. Immediately apply SHEETROCK Joint Tape centered over joint and seated into compound. Sufficient compound—approx. $\frac{1}{64}$ " to $\frac{1}{32}$ "—must remain under the tape to provide proper bond. Follow immediately with a thin skim coat to embed tape, but not to function as a second coat. Fold and embed tape properly in all interior angles to provide a true angle. The tape or embedding coat must be thoroughly dry prior to application of second coat. (Exception: DURABOND Setting-Type and EASY SAND Lightweight Setting-Type Joint Compounds need only have hardened prior to application of next coat.)
- C** Apply second coat of joint compound over embedding coat, filling panel taper flush with surface; cover tape and feather out at least 2" beyond first coat. On joints with no taper, cover the

tape and feather out at least 4" on either side of tape. Allow second coat to dry thoroughly prior to application of finish coat. (Exception: DURABOND Setting-Type and EASY SAND Lightweight Setting-Type Joint Compounds need only have hardened prior to second coat application.)

- D Spread finish coat evenly over and extend at least 2" beyond second coat on all joints and feather to a smooth uniform finish. Do not allow finished joint to protrude beyond plane of the surface. Apply a finish coat to cover tape and taping compound at all tapered angles and provide a true angle. Where necessary, sand lightly between coats and following the final application of compound to provide a smooth surface ready for decoration. When sanding take care not to roughen face paper.

3.11.2 SHEETROCK Fiberglass Drywall Tape

- A Mix joint compound in strict accordance with manufacturer's recommendations.
- B Center and apply SHEETROCK Fiberglass Drywall Tape directly over joint, pressing tape firmly so that it adheres evenly to surface. To eliminate wrinkles and ensure maximum bond, press entire length of tape with drywall knife. Avoid overlapping tape at intersections. Cut tape with drywall knife.
- C Cover with a layer of SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound, forcing compound through the tape with a drywall knife/trowel to completely fill and level the joint. Failure to completely fill the joint may result in cracking. Let dry and sand lightly as required.
- D Apply second coat of SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound, or SHEETROCK Drying-Type Joint Compound (powder or ready-mixed), feathering approximately 2" beyond first coat. Let dry and sand lightly as required.

3.12 Finishing Fasteners

Apply a setting-type, or all-purpose or lightweight all-purpose compound to fastener depressions as the first coat. Follow with a minimum of two additional coats of topping or all-purpose compound, leaving all depressions level with the surface. (Exception: Setting-type and lightweight all-purpose joint compounds need only one additional coat.)

3.13 Finishing Beads and Trims

- A Apply first coat to all bead and trim and properly feather out from ground to plane of surface. Compound must thoroughly dry prior to application of second coat. (Exception: SHEETROCK Setting-Type (DURABOND) and Lightweight Setting-Type (EASY SAND) Joint Compounds need only have hardened prior to application of next coat.)
- B Apply second coat in same manner as first coat, extending compound slightly beyond face of panel. Compound must be thoroughly dry prior to application of finish coat. (Exception: setting-type joint compounds need only have hardened prior to application of next coat.)
- C Apply finish coat to all bead and trim, extending compound slightly beyond the second coat and properly feathering from ground to plane or surface. (Exception: Only two coats of SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound or SHEETROCK Lightweight All Purpose Joint Compound Ready-Mixed (PLUS 3) are needed). When dry, sand finish as necessary to provide a flat smooth surface ready for decoration. When sanding take care not to roughen face paper.

3.14 Exterior Joint System Application

- A Mix SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound according to directions on the bag. Do not overmix, nor use in temperatures below 45°F.

- B Pre-fill joints of SHEETROCK brand Exterior Gypsum Ceiling Board with SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound. After pre-fill has hardened, embed SHEETROCK Joint Tape centered over joint. When compound has hardened, immediately apply fill coat.
- C Apply SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound over flanges of SHEETROCK Zinc Control Joints, metal beads and trim. Spot fastener heads.
- D After fill coat has hardened, apply finishing coat of SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound. Completely cover all joints, angles, beads, control joints and fasteners.

Note: After SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound has dried, apply one coat oil-based primer-sealer and one coat exterior oil or latex paint over entire surface.

3.15 Filling and Finishing Interior Concrete

- A Concrete surfaces shall be clean, smooth, dry and free from contaminants and exposed metal protected with a rust-inhibitive primer and allowed to dry.
- B Fill offsets and voids with a SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound.
- C Mix (COVER COAT Compound) (SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound) according to manufacturer's directions and apply to concrete (ceilings) (columns) before interior partitions are erected. Coordinate application of SHEETROCK No. 800 Corner Bead on angles and corners as required, embedding and covering both flanges with a smooth fill of compound 3" to 4" wide. Apply sufficient coats to obtain a smooth surface. If SHEETROCK Setting-Type Joint Compound (DURABOND) is used, and if an easier sanding surface is desired, then apply a skim coat of COVER COAT Compound over entire surface. After compound has dried, sand to a smooth surface suitable for decoration.

Product Information and Literature: 1-800-USG-4YOU (1-800-874-4968).

Sales Offices: Arizona: Phoenix, (602) 866-0795 • California: Fremont, (510) 792-4400, Glendale, (818) 956-1882 • Florida: Jacksonville, (904) 764-3293, Miami, (305) 557-4501 • Georgia: Atlanta, (404) 393-0770 • Hawaii: Honolulu, (808) 591-8815 • Illinois: Chicago, (312) 606-5488 • Indiana: Indianapolis, (317) 848-1513 • Louisiana: New Orleans, (504) 241-2020 • Maryland: Baltimore, (410) 355-2200 • Massachusetts: Charlestown, (617) 241-8530 • Michigan: Southfield, (313) 569-1900 • Minnesota: Bloomington, (612) 854-4233 • Missouri: St. Louis, (314) 349-0980 • New York: Albany, (518) 458-7437, Stony Point, (914) 786-2820 • North Carolina: Charlotte, (704) 552-7402 • Ohio: Cleveland, (216) 899-7333 • Oregon: Beaverton, (503) 626-8864 • Pennsylvania: Philadelphia, (410) 355-2200, Pittsburgh, (800) 289-4874 • Tennessee: Nashville, (615) 361-8419 • Texas: Dallas, (214) 490-0771, Houston, (713) 868-9937 • Utah: Salt Lake City, (801) 266-4975 • Virginia: Richmond, (804) 285-7528 • International Division: Chicago, (312) 606-5840.

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Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

Notice: We shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Our liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered.

Metric Specifications: USG Corporation, through its operating subsidiaries, will provide metric conversions on its products and systems to help specifiers match metric design sizes. In addition, some products are available in metric dimensions from selected manufacturing plants. Refer to SA-100 Construction Selector for additional information and a Table of Metric Equivalents.

United States Gypsum Company

125 South Franklin Street
P.O. Box 806278
Chicago, Illinois 60680-4124
A Subsidiary of USG Corporation

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TEXTONE Vinyl-Faced Gypsum Panels



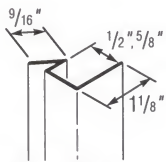
TEXTONE Vinyl-Faced Gypsum Panels and mouldings provide economical and permanent partitions that offer faster room completion and lower in-place cost than field-applied vinyl when used with conventional drywall framing systems or in combination with relocatable wall systems from USG Interiors. There's no mess—no joint compounds, no taping. No schedule delays either. The durable vinyl finish continues to look new with routine soapy water cleaning—reducing or eliminating redecorating costs.

Regular panels are 1/2" thick, 4' wide and 8', 9' and 10' long. May be special ordered in 3/8" and 5/8" thicknesses, 2' widths and custom lengths from 6' to 14'. FIRECODE Core Panels, 5/8" thick, and FIRECODE Core C Panels, 1/2" thick, are available 4' wide. All TEXTONE Vinyl-Faced Gypsum Panels meet ASTM C960.

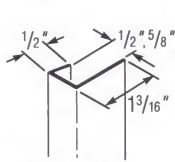
Mouldings

A complete line of surface mouldings provide the finishing touch on edges, corners and trim around openings. Mouldings are precision extruded from rigid plastic and are available plain (RP) in standard Almond or Ash Blue colors or factory laminated with matching TEXTONE Vinyl (RPV). Mouldings are easy to cut and mitre on the job. Included are: inside corner, end cap, snap-on corner, snap-on batten, ceiling/drive-in trim. For actual moulding samples, ask your United States Gypsum Company representative for Accessory Sample WB-1836.

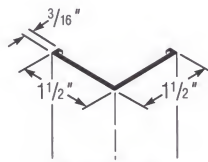
- **RP-2 and RPV-2 Inside Corner**—Install first panel so that vertical edge aligns with framing. Apply moulding by fastening exposed flange to framing. Insert opposite panel into moulding.
- **RP-4 and RPV-4 End Cap**—Align and fasten end cap to framing. Insert panel into moulding, apply panel to wall.
- **RP-5 and RPV-5 Snap-on Corner**—Apply panels using adhesive or adhesive/nail-on application. Place retainer strip over corner, fasten with nails or screws driven through holes provided and snap corner face onto retainer strip.
- **RP-7 and RPV-7 Snap-on Batten**—Apply panels using adhesive or adhesive/nail-on application. Place retainer strip over joint, fasten with nails or screws driven through holes provided and snap batten face onto retainer strip.
- **RP-46 and RPV-46 Ceiling Drive-in Trim**—Install after panels are applied. Insert grooved flange between runner and ceiling; tap trim into place. Adhesive may be required to secure trim.



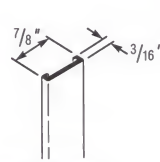
**RP-2, RPV-2
Inside Corner**



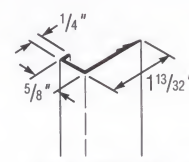
**RP-4, RPV-4
End Cap**



**RP-5, RPV-5
Snap-On Corner**



**RP-7, RPV-7
Snap-On Batten**



**RP-46, RPV-46 Ceiling
Drive-In Trim**

Test Data

Fire rating	Fire-rated construction		Acoustical performance		System reference
	Detail & physical data	Description & test no.	STC	Description & test no.	
1 hr.		Wood stud—3/8" TEXTONE vinyl-faced gypsum panels, FIRECODE core—2x4 16" o.c.—panels nailed 7" o.c. with 6d cement-coated 1 1/4" fasteners— UL Des U305 wt 7 width 4 3/4"			A
1 hr.		Steel stud—3/8" TEXTONE vinyl-faced gypsum panels, FIRECODE core—2 1/2" steel studs 24" o.c. with battens att to each stud with 1 1/4" Type S screw—aluminum battens over tracks— UL Des U405 wt 5 width 3 3/4"	45	G&H NG-146FT Based on 3" insulation.	B
2 hr.		Steel stud—2 layers 3/8" TEXTONE vinyl-faced gypsum panels, FIRECODE core—2 1/2" steel studs 24" o.c.—base layer att with 1" Type S screw, face layer att with 1 1/4" Type S screw 12" o.c. at floor & ceiling runner and laminated with adhesive— UL Des U411 wt 10 width 5"			C

Matching Wall Covering

Cotton sheet-backed TEXTONE Vinyl Wallcovering is available for field installation. Most wallcoverings weigh 1.2 to 1.4 oz./sq. yd. and come in 54" x 30 yd. rolls.

Panel surface burning

characteristics⁽¹⁾ and vapor permeance⁽²⁾

TEXTONE Pattern	Film Thickness or Weight	Flame Spread	Smoke Dev.	Vapor Perm.
Pumice	6 mils	20	25	0.8
Suede	6 mils	15	25	0.6
Presidio	6 mils	15	25	0.6
Granite	6 mils	15	25	0.6
Woodgrain	6 mils	20	15	0.6
Linen	8 mils	15	25	0.5
Country Weave	10 mils	20	35	0.8
Textile (Type I, Fabric-Backed) ⁽³⁾	10.7 oz./yd ²	25	80	1.0
Brittany (Type I, Fabric-Backed) ⁽³⁾	10.0 oz./yd ²	25	55	2.1

(1) Tested in accordance with ASTM E84-80. (2) Tested in accordance with ASTM E96-90.

(3) Comply with Federal Specification CCC-2-408C, Type I.

Limitations

- 1 Adhesives for attaching vinyl-faced gypsum panels to studs must be marked suitable for application with vinyl faced gypsum panels. Compliance with ASTM C557 does not assure that the adhesive was tested for compatibility with vinyl-faced gypsum panels.
- 2 In order to avoid yellow staining and show-through of the stud adhesive onto the surfaces of the gypsum panels, and delamination of the vinyl on vinyl-faced gypsum panels caused by the adhesive, solvent-based adhesives should not contain acetone, heptane, hexane, toluene or xylene.
- 3 If TEXTONE Vinyl-Faced Gypsum Panels, FIRECODE Core, are used in a fire-rated assembly instead of a non-vinyl-faced product such as SHEETROCK brand Gypsum Panels, FIRECODE Core, the applicable fire test must permit exposed joints or battens.
- 4 Not recommended for use over foil-back panels or other vapor retarder in exterior walls.
- 5 Avoid exposure to excessive or continuous moisture and extreme temperatures.
- 6 Do not apply on exterior walls in hot, humid climates without suitable vapor control or dry air circulation behind the panels.

Range A

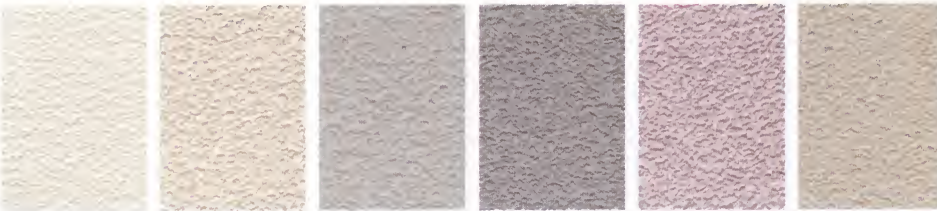
Pumice



Pearl (66) Vanilla (66) Bright Beige (66) Stone (68)

TEXTONE Vinyl-Faced Gypsum Panels are available in 38 vinyl finishes, factory-applied. For actual samples, see swatchbook WB-1835.

The vinyl finishes below are organized by price range, with Range A lowest and Range E highest. Average light reflectance values are in parenthesis after finish names.



Shell (73) Bone (64) Putty (38) Clay Gray (36) Satin Mauve (66) Adobe (53)

Range B

Suede



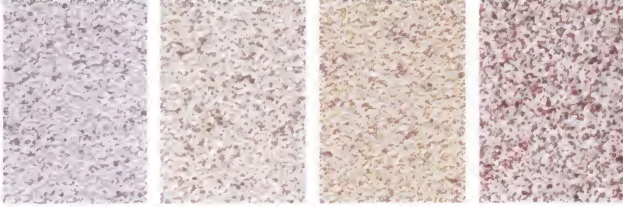
Old Ivory (61) Summer Shore (48) White Frost (64)

Presidio



Reed (78) Linear (78) Island (78) Zephyr (78)

Granite



Chalk Blue (63) Olive Stone (63) Woodland (63) Tapestry (63)

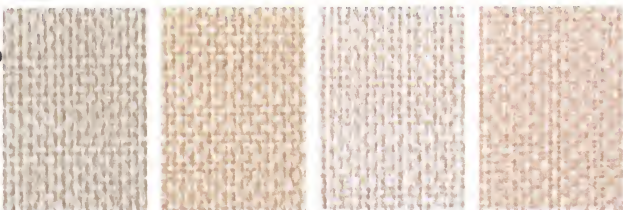
Woodgrain



Natural Pecan (15)

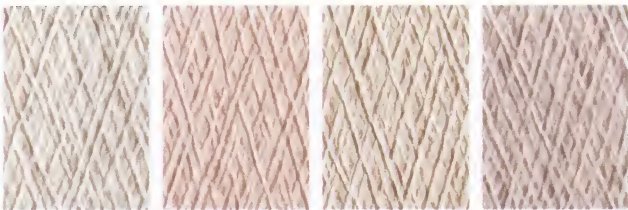
Range C

Linen



Pewter (56) Straw (56) Champagne (60) Basket (58)

Country Weave



Cream (58) Beach (58) Wicker (45) Fog (42)

Range D

Textile



Scroll (71) Chalk (50) Mist White (63)

Brittany



Mauve (31) Bluebrook (44) Natural (58) Dove Gray (45) Tahiti (44)

These photos show the actual vinyl laminated to gypsum panels. Slight color differences may exist between the printed colors shown and the actual product colors. Refer to swatchbook WB-1835 for vinyl samples.

Note: New colors and finishes are continually becoming available. See your U.S. Gypsum representative for the latest available colors and finishes.

Good Design Practices

- 1 **For fire-rated assemblies**—refer to application requirements of the specific system tested. Mechanical fastening is usually required along with a specific type of adhesive.
- 2 **Adhesives**—for more complete details and application using adhesives, see *Gypsum Panels and Accessories Folder*, SA-927, in this series and manufacturer's directions.
- 3 **Additional information**—refer to *TEXTONE Vinyl-Faced Gypsum Panels Installation & Maintenance/Technical Data*, WB-1330, and *TEXTONE Decorative Mouldings*, WB-1385.

Architectural Specifications

Part 1: General

1.1 Scope—Specify to meet project requirements.

1.2 Qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and installed by workers experienced in this trade.

1.3 Delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Environmental conditions

In cold weather the building shall be heated and ventilated during application of gypsum vinyl-faced panels to maintain temperature and ventilation consistent with good working conditions for finish work.

Part 2: Products

2.1 Gypsum vinyl-faced panels

TEXTONE (type)(pattern and color)(thickness and size)(core formulation).

2.2 Mouldings and trim

(type) TEXTONE Mouldings, (pattern and color)(thickness and size).

2.3 Adhesives

(SHEETROCK Setting Type Joint Compound-DURABOND 210 or 90)(SHEETROCK Taping or All Purpose Joint Compound Ready-Mixed). Specify from *Gypsum Panels and Accessories Folder*, SA-927.

2.4 Fasteners (panels)

- A Coordinated color nails (color)(length). Specify: 1 $\frac{3}{8}$ " for single layer, 1 $\frac{1}{2}$ " for double layer.
- B Type S screws (length). Specify: 1" for single layer, 1 $\frac{3}{8}$ " for double layer.
- C Vinyl foam tape: 1 $\frac{1}{2}$ " wide min., $\frac{1}{2}$ " to $\frac{1}{8}$ " thick. Specify to eliminate mechanical fasteners or temporary bracing and for temporary attachment of adhesively applied panels until adhesive attains maximum bonding strength.

2.5 Fasteners (mouldings and trim)

- A Screws—(1" Type S Bugle Head)(1 $\frac{1}{4}$ " Type W Bugle Head).
- B Nails—obtain locally—($\frac{1}{2}$ " x 18 Flat-Head Wire)(1 $\frac{1}{4}$ " Annular Ring Drywall).

Part 3: Execution

3.1 TEXTONE Vinyl-Faced Gypsum Panels—wood or steel studs

Apply 8" long strip of vinyl foam tape to face of each stud, positioned at midpoint of studs up to 8' long, at third-points on studs up to 12' long and quarter-points on studs over 12'. Where no mechanical fasteners are to be used at top or bottom of stud, apply an 8" long strip of tape on the track or wood plate at each

stud. Apply a continuous $\frac{3}{8}$ " bead of drywall stud adhesive to the entire face of studs between vinyl foam tape. Immediately apply TEXTONE Vinyl-Faced Gypsum Panels vertically and apply sufficient pressure to ensure complete contact with both tape and adhesive. Where use of color-matching nails is desired along ends and edges of board and in conjunction with drywall stud adhesive, drive nails with plastic-headed hammer or rawhide mallet. Space nails at least $\frac{3}{8}$ " from ends and edges and 8" o.c.

3.2 TEXTONE Vinyl-Faced Gypsum Panels—base layer of gypsum panels

Apply liquid contact adhesive to back of TEXTONE Vinyl-Faced Gypsum Panels and face of base layer according to adhesive manufacturer's directions. Allow adhesive to air dry, then bring panels into contact. Apply pressure to entire surface to ensure complete contact.

3.3 TEXTONE Vinyl-Faced Gypsum Panels—base layer of masonry, gypsum panels, wood or mineral fiber board

For interior masonry walls and gypsum board, apply continuous strips of vinyl foam tape to entire width of TEXTONE Vinyl-Faced Gypsum Panel back at midpoint and $\frac{3}{8}$ " from each end. Spread laminating adhesive over entire area of panels between tape using notched metal spreader with $\frac{1}{4}$ " x $\frac{1}{4}$ " notches spaced 2" o.c. Position panel and immediately apply sufficient pressure to ensure complete contact over entire surface. (Mechanical fasteners may be substituted for tape at ends of panels.)

For application of TEXTONE Vinyl-Faced Gypsum Panels to wood or mineral board, pre-bow panels and apply laminating adhesive over entire back surface.

3.4 TEXTONE Mouldings

Finish panel joints, edges and corners with either plain TEXTONE Mouldings or mouldings to match specified panel finishes and install mouldings with fasteners 8" to 12" o.c. For snap-on mouldings, fasten through holes in the retainer clip which is included with the snap-on moulding.

Product Information and Literature: 1-800-USG-4YOU (1-800-874-4968).

Trademarks—The following trademarks used herein are owned by United States Gypsum Company or a related company: DURABOND, FIRECODE, SHEETROCK, TEXTONE.

Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

Notice: We shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Our liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered.

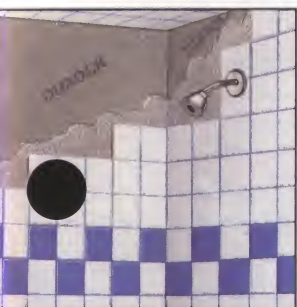
Sales Offices: **Arizona:** Phoenix, (602) 866-0795 • **California:** Fremont, (510) 792-4400, Glendale, (818) 956-1882 • **Florida:** Jacksonville, (904) 764-3293, Miami, (305) 557-4501 • **Georgia:** Atlanta, (404) 393-0770 • **Hawaii:** Honolulu, (808) 591-8815 • **Illinois:** Chicago, (312) 606-5488 • **Indiana:** Indianapolis, (317) 848-1513 • **Louisiana:** New Orleans, (504) 241-2020 • **Maryland:** Baltimore, (410) 355-2200 • **Massachusetts:** Charlestown, (617) 241-8530 • **Michigan:** Southfield, (313) 569-1900 • **Minnesota:** Bloomington, (612) 854-4233 • **Missouri:** St. Louis, (314) 349-0980 • **New York:** Albany, (518) 458-7437, Stony Point, (914) 786-2820 • **North Carolina:** Charlotte, (704) 552-7402 • **Ohio:** Cleveland, (216) 899-7333 • **Oregon:** Beaverton, (503) 626-8864 • **Pennsylvania:** Philadelphia, (410) 355-2200, Pittsburgh, (800) 289-4874 • **Tennessee:** Nashville, (615) 361-8419 • **Texas:** Dallas, (214) 490-0771, Houston, (713) 868-9937 • **Utah:** Salt Lake City, (801) 266-4975 • **Virginia:** Richmond, (804) 285-7528 • **International Division:** Chicago, (312) 606-5840.

United States Gypsum Company

125 South Franklin Street
P.O. Box 806278
Chicago, Illinois 60680-4124
A Subsidiary of USG Corporation

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DUROCK Cement Board Systems



Walls and Ceilings



Ceilings/Soffits



Fences



Fireplace Fronts/Hearth Extensions



Mobile Home Skirting



Animal/Farm Enclosures



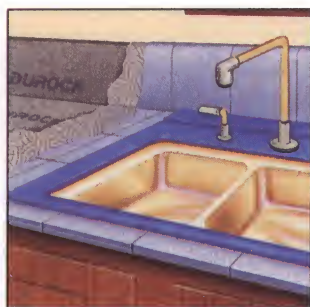
UL Listed Wall Shield/Floor Protector



Garage Wainscoting



Dentils/Quoins



Counter Tops/Backsplashes



Chimneys



Floors

DUROCK Cement Board...

**The multi-purpose building panel
for interior/exterior applications**

DUROCK Cement Board, the multi-purpose building panel, offers architects, builders and tile contractors a strong, water-damage resistant tile base for tub and shower areas. Also an ideal underlayment for tile on floors and counter tops in new construction and remodeling. Board is readily applied over wood or steel framing spaced 16" o.c. with DUROCK Wood or Steel Screws or galvanized roofing nails. After joints are treated, ceramic wall or floor tile are applied using latex fortified mortar or Type I organic adhesive.

The 1/2" thick DUROCK Cement Boards are listed by Underwriters Laboratories, Inc., for use with UL-listed solid-fuel room heaters and fireplace stoves. Used as a wall shield, board reduces by two-thirds the manufacturer-specified clearance (minimum 12") between room heater or stove and combustible wall surface. Board may also be used as a floor protector in place of one layer of 3/4" thick millboard. For hearth extensions see Specification 3.6B on page 8.

In addition to standard 1/2" DUROCK Cement Board, DUROCK Underlayment is available for floors and counter tops. Its nominal 3/8" thickness helps eliminate transition trim when abutting carpet or wood flooring and helps minimize level variations with other finish materials. Its 4'x4' size is easy to handle and helps cut down on waste. Applies directly over old substrate on counter tops to save time.

DUROCK Exterior Cement Board is preferred by many applicators for its added strength in interior applications. However, its primary use is as a base for USG Exterior Textured Finish and other finish options used in building exteriors. See *SA-700 USG Exterior Products & Systems* for complete information on the applications of this product.

Features and Benefits

High performance—DUROCK Cement Board possesses high flexural and compressive strength, hardness and impact resistance.

Smooth or textured—Board is smooth on one side for mastic applications, textured on other side for mortar applications. Textured surface enhances bonding and reduces tile slip.

Dimensionally stable—Board is rigid and exhibits excellent water-damage resistance properties as a permanent tile base. It will not swell, soften, decay, delaminate or disintegrate.

Fire-resistant—DUROCK Cement Board is a non-combustible panel. Assemblies with 1/2" DUROCK Cement Board have achieved 1- and 2-hr. fire-resistance ratings. Surface burning characteristics for DUROCK Cement Board: flame spread 5, smoke developed 0.

Lighter weight—At approximately 3 psf, the 1/2" thick board weighs only one-fourth the weight of a 1" thick metal lath and cement plaster bed.

Easy installation—DUROCK Cement Board is easy to cut and fasten with DUROCK Screws or galvanized roofing nails. Simple dry panel application eliminates cement mixing and drying time, shortening job schedules and lowering in-place cost.

Sound control—Sound isolation ratings up to 65 STC are offered with steel-framed partitions.

Convenient sizes—DUROCK Cement Board may be ordered in sizes to meet job requirements. A 3/8" thickness, custom lengths from 32" to 96", and 32", 36" or 48" widths are available.

Versatile application—DUROCK Cement Board provides a smooth, sound base for glass and ceramic mosaics; ceramic and quarry tile; lugged tile; USG Exterior Textured Finish; thin stone tile and thin brick. Suitable for application to wood or steel framing spaced 16" o.c. in new construction and in remodeling. Board is ideal for use in partitions, walls, floors, soffits and ceilings in wet or dry areas. It is highly durable in high-moisture areas found in baths, showers, kitchens and laundry rooms. Also adaptable for fences, fireplace fronts, mobile home skirting, agricultural buildings, UL-listed wall shield/floor protector, garage wainscoting and exterior chimneys.

Limitations

- 1 Systems using DUROCK Cement Board are designed for positive or negative uniform loads up to 30 psf. (See *SA-700 USG Exterior Products & Systems* for complete information on finishing DUROCK Exterior Cement Board and for uniform loads up to 40 psf.)
- 2 Maximum stud spacing: 16" o.c. (24" o.c. for cavity shaft wall assembly); maximum allowable deflection, based on stud properties only, L/360. Maximum fastener spacing: 8" o.c. for wood and steel framing; 6" o.c. for ceiling applications.
- 3 Maximum dead load for ceiling system is 7.5 psf.
- 4 Steel framing must be 20 ga. or heavier.
- 5 Do not use drywall screws or drywall nails.

Product Data

Material: Formed in a continuous process of aggregated portland cement slurry with polymer-coated, glass-fiber mesh completely encompassing edges, back and front surfaces.

Edges: Formed smooth—Patent No. 4,916,004.

Ends: Square cut.

Sizes and Packaging

Type	Thickness		Width		Length		Ship. Units
	Standard	Custom ⁽¹⁾	Standard	Custom ⁽¹⁾	Standard	Custom ⁽¹⁾	
Cement Board	1/2"	3/8"	32", 36" 48"		5' 3' to 8'		40
	1/2"	3/8"	32"		8' 4' to 8'		30
Underlayment	3/8"		48"		4' 4' to 8'		40
Exterior Cement Board	1/2"	3/8"	48" 32"		8' 4' to 10'		20

(1) Minimum quantity required for custom sizes.

(2) Stretch-wrapped and shipped in packaging units as shown.

Building Code Data

See National Evaluation Service Report Nos. 259 and 396 for allowable values and/or conditions of use concerning material presented in this document. These reports are subject to reexamination, revisions and possible changes.

Standards

DUROCK Cement Board exceeds the ANSI Standards for cementitious backer units (CBU). See ANSI A118.9-1990 for Test Methods and Specifications for CBU and ANSI 108.11-1990 for Interior Installation of CBU.



LISTED 34L2
For floor protectors
and wall shields.

Typical Physical Properties

Property	ASTM test reference	Cement board value	Underlayment value	Exterior board value
Flexural strength—psi	C947-81	750	1250	1000
Indentation strength—psi 1" dia. disc @ 0.02" indent.	D2394	2300	2300	2300
Uniform load—psf studs 16" o.c.	—	30 max.	—	40 max.
Water absorption—% by wt. 24 hrs.	C473-84	10	10	10
Nail pull resistance—lb. 0.4" head diameter (wet or dry)	C473-84	125	—	125
Weight—psf	C473-84	3	2	3
Freeze/thaw resistance—procedure B number of cycles with no deterioration	C666-84	100	100	100
Surface burning characteristics—flame/smoke	E84-84	5/0	5/0	5/0
Thermal "R"/k value	C177	0.26/1.92	—	0.26/1.92
Standard method for evaluating ceramic floor tile installation systems	C627	Residential	Residential	—
Min. bending radius—ft.	—	8	—	8

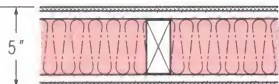
(1) Requires special framing. Details available on request.

1-Hour Partitions


Wood-Framed/Load Bearing


RC-1™ Resilient Channel

THERMAFIBER Insulation¹

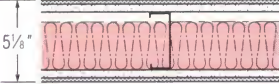
Detail/Physical Data	Description	Fire Test	STC	Sound Test	Reference
	1/2" DUROCK cement panel and 1/2" ceramic tile—2x4 16" o.c.—3 1/2" THERMAFIBER SAFB—board att with 1 1/2" DUROCK screws or 1 1/2" galv nails 8" o.c.—joints taped—alt. design 3/4" SHEETROCK brand gypsum panels, FIRECODE core, one side	UL Des U329	37 40	USG-840404 Based on alt. design— USG-840314	A

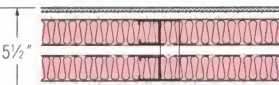
Steel-Framed/Load Bearing²


	1/2" DUROCK cement panel—base layer 3/4" SHEETROCK brand gypsum panels, FIRECODE core—3 1/2" studs 16" o.c.—3" THERMAFIBER SAFB—board att with 1 1/2" DUROCK screws 8" o.c.—joints taped	UL Des U473	N/A		B
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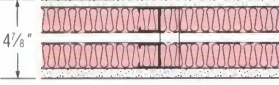
	3/4" SHEETROCK brand gypsum panels, FIRECODE core, att with 1 1/2" screws 16" o.c. at edges, 12" o.c. in field—base layer 1/2" DUROCK cement panel—board att with 1 1/2" DUROCK screws 24" o.c.—3 1/2" studs 16" o.c.—3" THERMAFIBER SAFB	UL Des U485	N/A		C
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Steel-Framed/Non-Load Bearing²

	1/2" DUROCK cement panel and 1/2" ceramic tile—3 1/2" studs 16" o.c.—3" THERMAFIBER SAFB—board att with 1 1/2" DUROCK screws 8" o.c.—joints taped—alt. design 3/4" SHEETROCK brand gypsum panels, FIRECODE core, one side	UL Des U442	48 ³ 50 ³	SA-840321 Based on alt. design— SA-840313	D
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	Plumbing Chase Wall—1/2" DUROCK cement panel and 1/2" ceramic tile—1 1/2" studs 16" o.c. in two rows with horiz braces—1 1/2" THERMAFIBER SAFB in both stud cavities—board att with 1 1/2" DUROCK screws 8" o.c.—joints taped—alt. design 3/4" SHEETROCK brand gypsum panels, FIRECODE core, one side	UL Des U445	61 60	Based on 3" SAFB & 3 1/2" studs—SA-840524 Based on 3" SAFB & alt. design—SA-840515	E
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	1/2" DUROCK cement panel—3 1/2" studs 16" o.c.—3" THERMAFIBER SAFB—board att with 1 1/2" DUROCK screws 8" o.c.—joints taped and treated—3/4" SHEETROCK brand gypsum panels, FIRECODE C core	UL Des U457	47 ³	Based on 3/4" SHEETROCK brand gypsum panels, FIRECODE core—USG-840222	F
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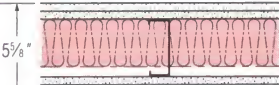
	Plumbing Chase Wall—1/2" DUROCK cement panel—1 1/2" studs 16" o.c. in two rows with horiz braces—1 1/2" THERMAFIBER SAFB in both stud cavities—board att with 1 1/2" DUROCK screws 8" o.c.—joints taped—3/4" SHEETROCK brand gypsum panels, FIRECODE C core	UL Des U458	57	Based on 3 1/2" studs & 3" SAFB—SA-840505	G
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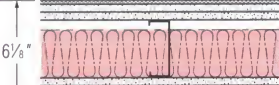
2-Hour Partitions

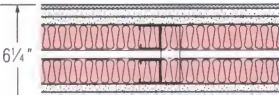
Wood-Framed/Load Bearing

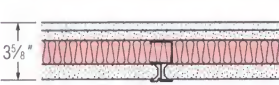
	Plumbing Chase Wall—1/2" DUROCK cement panel and 1/2" ceramic tile—2 rows 2x4 16" o.c. on 2x8 com plate—3 1/2" THERMAFIBER SAFB in both stud cavities—board att with 1 1/2" DUROCK screws or 1 1/2" galv. nails 8" o.c.—joints taped	WHI-495-0505 & 0508	50	SA-840523	H
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Steel-Framed/Non-Load Bearing²

	1/2" DUROCK cement panel—base layer 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, both sides—3 1/2" studs 16" o.c.—3" THERMAFIBER SAFB—board att with 1 1/2" DUROCK screws 8" o.c.—joints taped—alt. design double layer 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, on one side	UL Des U474	N/A		I
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	2 layer—1/2" DUROCK cement panel and 1/2" ceramic tile—base layer 1/2" SHEETROCK brand gypsum panels, FIRECODE C core—3 1/2" studs 16" o.c.—3" THERMAFIBER SAFB—board att with 1 1/2" DUROCK screws 8" o.c.—joints taped—alt. design 2 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, one side	UL Des U443	58 ³ 56 ³	SA-851028 Based on alt. design— SA-851016	J
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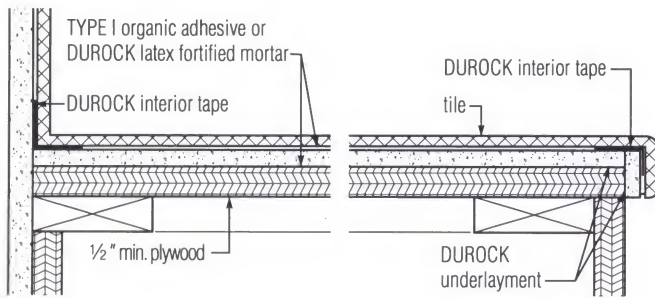
	Plumbing Chase Wall—2 layer—1/2" DUROCK cement panel and 1/2" ceramic tile—base layer 1/2" SHEETROCK brand gypsum panels, FIRECODE C core—1 1/2" studs 16" o.c. in two rows with horiz braces—1 1/2" THERMAFIBER SAFB in both stud cavities—board att with 1 1/2" DUROCK screws 8" o.c.—joints taped—alt. design 2 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, one side	UL Des U444	65 62	SA-851112 Based on alt. design— SA-851102	K
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	Cavity Shaft Wall—1/2" DUROCK cement panel—1/2" SHEETROCK brand gypsum panels, FIRECODE core—1" SHEETROCK brand gypsum liner panels set betw USG steel 20-ga. min C-H studs 24" o.c.—1 1/2" THERMAFIBER SAFB—cement board screw att with 1 1/2" DUROCK screws 8" o.c. & laminated to gypsum panel with 4" strip ceramic tile mastic applied with 1/2" notched trowel midway betw studs—joints fin	UL Des U459	N/A		L
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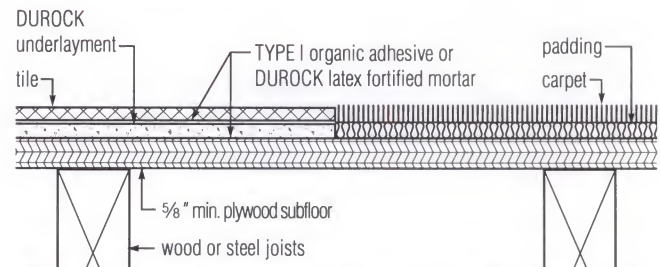
⁽¹⁾ Where thermal insulation is shown in assembly drawing, the specific product is required in the assembly to achieve the stated fire rating. Fiberglass insulation can not be substituted for THERMAFIBER Insulation. ⁽²⁾ Steel framing must be 20 ga. or heavier. ⁽³⁾ Estimate based on 25-ga. steel studs.

Interior Framing Systems

Counter tops

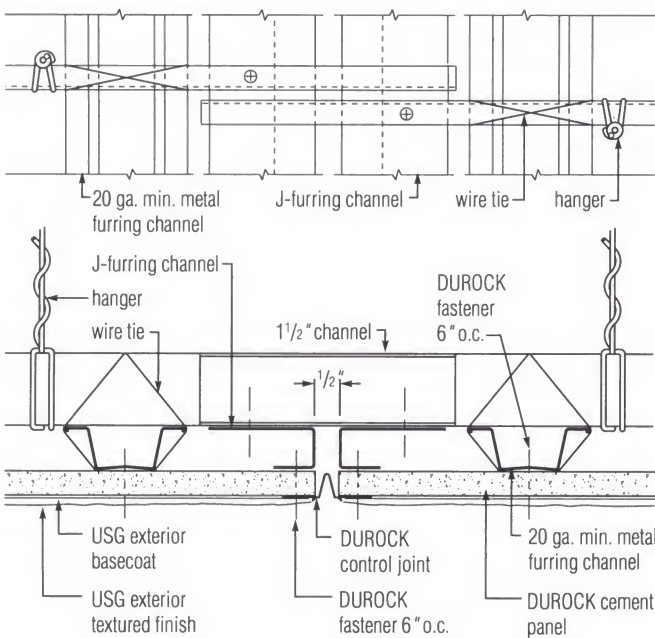


Floors, interior-wood or steel joists

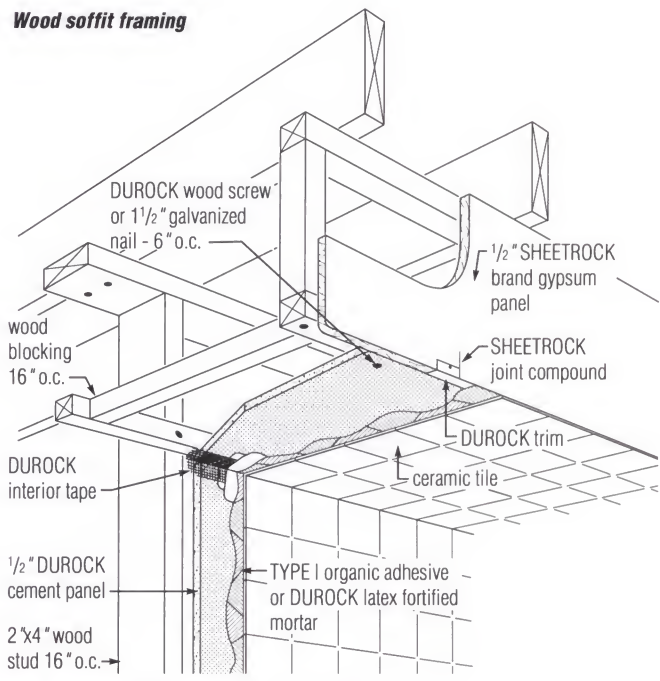


Note: For floor and counter top applications, use latex fortified mortar for heavy tiles, such as quarry, pavers, button-back and floor tiles over 6" x 6" size.

Suspended ceiling detail

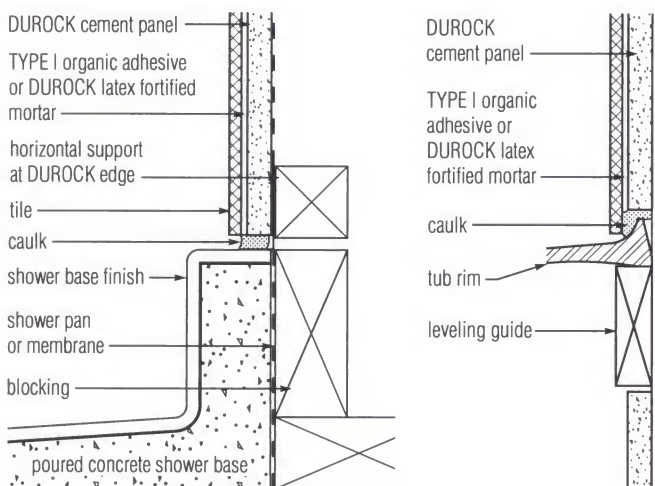


Wood soffit framing

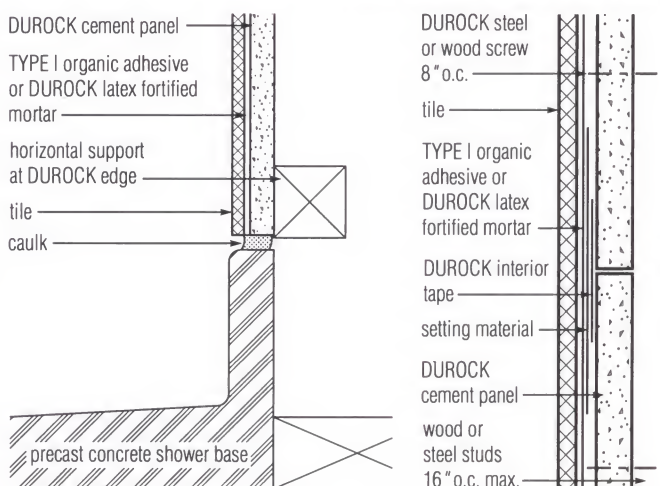


Note: Steel soffit framing detail is also available.

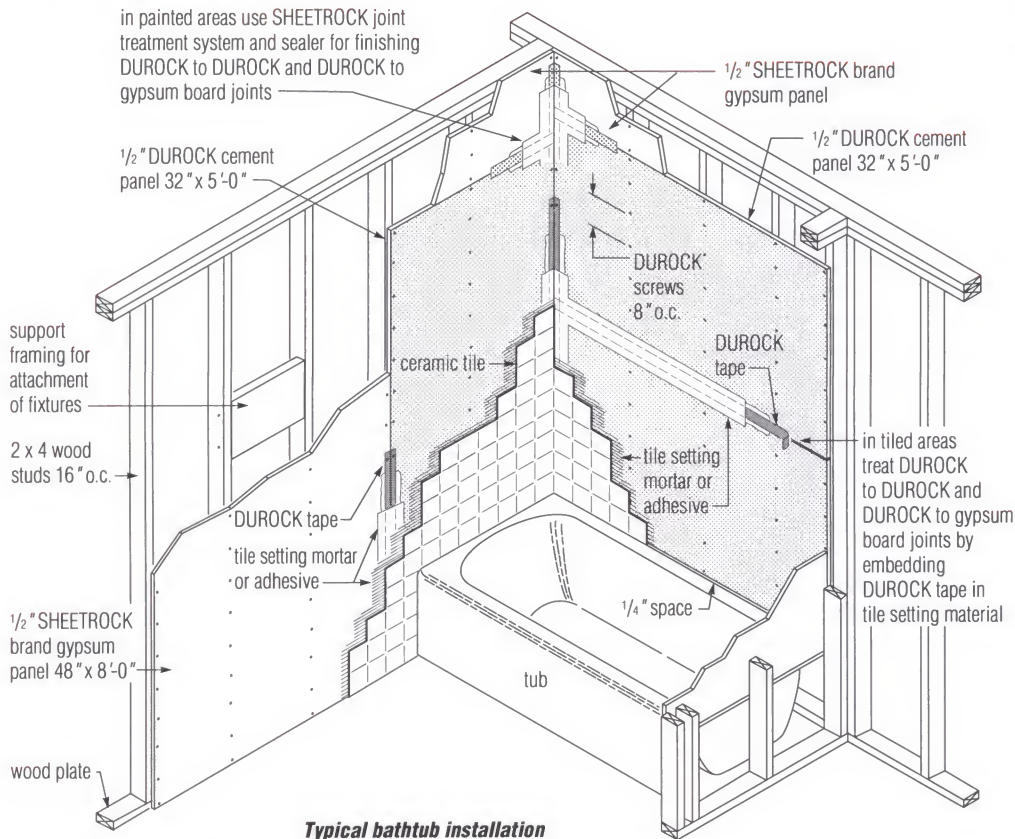
Tub and shower - single layer board



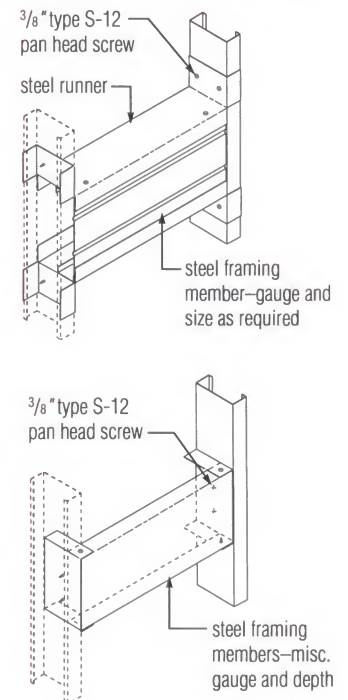
Walls, interior - wood or steel studs



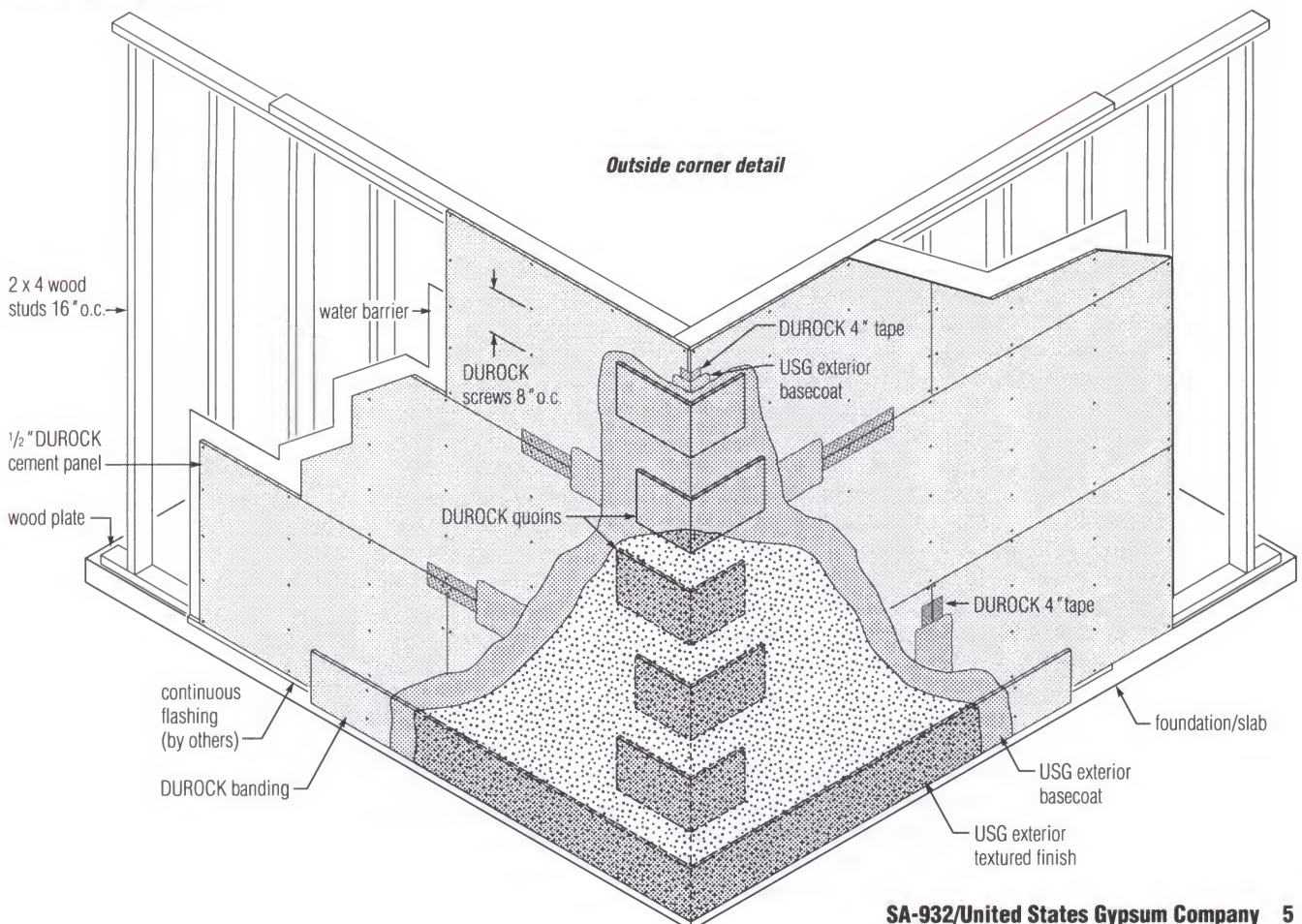
Interior Framing Systems



Fixture attachment - steel framing



Exterior Framing System



- 1 System Performance**—Systems covered herein have been tested and evaluated for use as described. For other system applications, consult your local representative.

All details, specifications, and data contained in this literature are intended as a general guide for using DUROCK Cement Board Systems. These products must not be used in a design or construction of any given structure without complete and detailed evaluation by a qualified structural engineer or architect to verify suitability of a particular product for use in the structure.

Information in this publication should be used only for DUROCK Cement Board Systems, as physical properties of competitive products may vary. United States Gypsum Company assumes no liability for failure resulting from the use of alternative materials or improper application or installation of DUROCK Cement Board Systems as specified herein.

United States Gypsum Company will provide building officials and design professionals upon written request with test certification for published fire, sound and structural data covering systems constructed with Company products and assembled to meet performance requirements of established test procedures specified by various agencies.

- 2 Expansion and Contraction**—Wall surfaces should be isolated with surface control joints (sometimes referred to by the industry as expansion joints) or other means where: (a) a wall abuts a structural element or dissimilar wall or ceiling; (b) construction changes within the plane of the wall; (c) tile and thin brick surfaces exceed 16' or USG Exterior Finish System surface exceeds 20' in either direction. Surface control joint width should comply with architectural practices.

Location of building control joints is the responsibility of the design professional/architect. Steel framing at building control joints that extend through the wall (with top and bottom runner tracks broken) should have 1½" cold-rolled channel alignment stabilizers spaced a maximum of 5'0" o.c. vertically. Channels should be placed through holes in the stud web of the first two adjacent studs on both sides of the joint and securely attached to the first adjacent stud on either side of the joint.

Cement board should be separated at all surface and building control joints. Where vertical and horizontal joints intersect, the vertical joint should be continuous and the horizontal joint should abut it. Splices, terminals and intersections should be caulked with a sealant complying with architectural practices and sealant manufacturer recommendations. Do not apply tile or finishes over caulked sealed expansion joints. (See *SA-700 USG Exterior Products & Systems* for additional information).

- 3 Water Barrier**—DUROCK Cement Board is vapor permeable but provides resistance to water penetration. For interior applications, if a vapor retarder or waterproof construction is specified, a separate barrier must be applied over or behind the DUROCK Board. For exterior applications, a water barrier must be installed over the studs with a 2" overlap or stapled to the back of the DUROCK Cement Board before it is applied.
- 4 Swimming Pool Enclosures**—DUROCK Cement Board Systems may be used for the walls and ceilings around indoor swimming pools. Consideration shall be given for adequate ventilation and protection of metal hangers and framing members.
- 5 Soffits and Ceilings**—DUROCK Exterior Systems finished with ceramic tile, thin brick and USG Exterior Textured Finish may be used on properly vented soffits and ceilings with DUROCK Screws spaced 6" o.c. max. A qualified structural engineer should evaluate design including uplift bracing.
- 6 Steam Rooms and Saunas**—For steam rooms and saunas where temperatures exceed 120° F for extended periods, use dry-set or latex-portland cement mortar; do not use organic adhesive.

- 7 Window and Door Openings**—All window and door openings must be properly flashed and caulked. Grout exterior steel door frames with portland cement mortar.

- 8 Shadowing and Spotting**—When the outside temperature differs considerably from the building's interior temperature, airborne dirt can accumulate on the colder regions of walls causing "shadowing" or "spotting," particularly over fasteners and framing. This is a natural phenomenon which occurs through no fault in the products.

Where temperature, humidity and soiling conditions are expected to cause objectionable blemishes, provide a thermal separation between the interior and exterior faces.

- 9 Leaching and Efflorescence**—Latex leaching and efflorescence are natural phenomena which occur with the use of latex modified mortars and grouts through no fault in the products. To help protect against their occurrence, follow current industry guidelines and recommendations.
- 10 Vapor Retarders**—Humidity and temperature conditions may require a vapor retarder. Its location should be determined by a qualified mechanical engineer or architect to prevent moisture condensation within the wall.
- 11 Additional Information**—See product folders in this series: *Gypsum Panels & Accessories* folder SA-927 for information on system components; *USG Exterior Products & Systems* folder SA-700; *Plaster Systems* folder SA-920 for plaster system components; *THERMAFIBER Life-Safety Fire Containment Systems* folder SA-707 for data on insulation and mineral fireproofing; *Drywall/Steel-Framed Systems* folder SA-923 for load-bearing and non-load bearing steel framing systems.

Part 1: General

1.1 Scope—Specify to meet project requirements.

1.2 Qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company and shall be installed in accordance with their current printed directions.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Environmental Conditions

Interior Applications—In cold weather and during DUROCK Cement Panel and tile installation, temperatures within the building shall be maintained within the range of 45° to 100° F. Adequate ventilation shall be provided to carry off excess moisture. Wood framing shall approximate the moisture content it will reach in service by allowing the enclosed building to stand as long as possible prior to the application of the cement board. Do not install board when it is wet.

Exterior Applications—Finishes, leveling/skim coats and basecoats shall not be applied to DUROCK Cement Panel that is wet, frozen or contains frost. After application, and for at least 24 hours, finishes, leveling/skim coats and basecoats shall be effectively protected from rain and excessive moisture.

In cold weather and during finish applications, DUROCK Cement Panel, skim or basecoat, mortar, finish material and air temperature must be at least 45° F and must remain at this temperature or higher for at least 24 hours after application. Hot and dry weather may affect working time of leveling/skim or basecoat and finish materials. Under rapid drying conditions, dampening of board, leveling/skim or basecoat surface may be required to improve workability.

1.5 Framing

Steel or wood wall framing to receive DUROCK Cement Panel shall be structurally sound, free from bow, and in general compliance with

local building code requirements. Damaged and excessively bowed studs shall be replaced before installation of DUROCK Cement Panel. Framing shall be designed (based on stud properties alone) not to exceed L/360 deflection for tile and thin brick, L/240 for USG Exterior Textured Finish and EIFS. Steel framing must be 20-ga. or heavier with a corrosion-resistant metal coating equivalent to G60 hot-dipped galvanized. Exterior steel framing should be laterally braced.

1.6 Installation Practices

DUROCK Panel should be cut to size with a carbide-tipped knife and a straight edge. A power saw should be used only if it is equipped with a dust collection device and NIOSH-approved dust mask is worn.

Part 2: Products

2.1 Materials

A Cement Board

- DUROCK Cement Board, $\frac{1}{2}$ " or $\frac{5}{8}$ " thickness, 32", 36" or 48" width x lengths of 3' to 8'.
- DUROCK Underlayment, $\frac{5}{16}$ " thickness, 48" width x 4' length.
- DUROCK Exterior Cement Board, $\frac{1}{2}$ " thickness, 48" width x 8' length.

- B Joint Reinforcement**—DUROCK Interior Tape, 2" x 50'.
—DUROCK Exterior Tape, 4" x 150'.

C Fasteners

- DUROCK Steel Screws, $\frac{1}{4}$ " and $1\frac{1}{2}$ " for 14 to 20-ga. steel framing; DUROCK Wood Screws, $\frac{1}{4}$ ", $1\frac{1}{8}$ " and $2\frac{1}{4}$ " for wood framing.
- Nails ($1\frac{1}{2}$ " hot-dipped galvanized roofing nails).
- Staples ($\frac{1}{4}$ " x $\frac{7}{8}$ " galvanized staples for DUROCK Underlayment).

- D Subfloor**—($\frac{3}{8}$ ") ($\frac{3}{4}$ ") plywood, 4' x 8' sheets, exterior grade or better, exterior glue conforming with PS-1-66, T&G or back block long edges.

E Adhesives/Mortars

- Products compatible with high pH-based DUROCK Cement Board:
- Meeting ASTM C557-73: multi-purpose adhesive (for subfloor to framing attachment).
- Meeting ANSI A136.1 Type I: DUROCK Ceramic Tile Adhesive.
- Meeting ANSI A118.4: DUROCK Latex Fortified Mortar.
- Meeting ANSI A118.1: thin-set mortar (can be mixed with Acrylic Latex Additive).

F Grout

- Products compatible with high pH-based DUROCK Cement Board:
- Meeting ANSI A118.6: DUROCK Latex Fortified Grout;
- Commercial Dri-Set Grout mixed with Acrylic Latex Grout Additive.

- G Tile**—Tile shall meet ANSI A137.1.

- H Basecoat for USG Exterior Finish System**—(USG Exterior Basecoat) (USG Exterior Ready-Mixed Basecoat) (USG Exterior Basecoat—Fiber-Reinforced), gray, ready-to-mix portland cement mortar containing dry latex polymers.

- I Finish Coat for USG Exterior Finish System**—USG Exterior Textured Finish, ready-mixed acrylic coating, (fine or coarse).

Part 3: Execution

3.1 Floors

- A Subfloor**—Apply $\frac{3}{8}$ " bead of multi-purpose adhesive to center of top flange of joists. Place $\frac{5}{8}$ " min. exterior grade plywood sheets with long dimension across or parallel to wood or steel joists spaced max. 16" o.c. Fasten plywood to steel joists with $1\frac{1}{8}$ " pilot point Type S-12 screws spaced 16" o.c. Fasten plywood to wood joists with adhesive and suitable nails or screws spaced max. 12" o.c.
- B Panel Application**—Laminate $\frac{5}{16}$ " DUROCK Underlayment to subfloor using ceramic tile adhesive, latex fortified mortar or thin-set mortar mixed with acrylic latex additive applied to

subfloor with $\frac{1}{4}$ " square-notched trowel for thin set, $\frac{5}{32}$ " V-notched trowel for adhesive. Place underlayment with joints staggered from subfloor joints. Fit ends and edges closely but not forced together. Fasten to subfloor with $1\frac{1}{4}$ " DUROCK Wood Screws or $1\frac{1}{2}$ " galvanized roofing nails spaced 8" o.c. in both directions with perimeter fasteners at least $\frac{3}{8}$ " and less than $\frac{5}{8}$ " from ends and edges; or with $\frac{1}{4}$ " x $\frac{7}{8}$ " galvanized staples spaced 4" o.c. in both directions.

$\frac{1}{2}$ " and $\frac{3}{8}$ " DUROCK Cement Board—Same procedure as DUROCK Underlayment except fastening with staples is not permitted.

3.2 Walls

- A Framing**—Space wood and steel framing a maximum of 16" o.c. (24" o.c. for UL Design U459). The studs of freestanding furred walls must be secured to exterior wall with wall furring brackets or laterally braced with horizontal studs or runners spaced 4' o.c. max. Laterally brace all steel framed walls prior to application of joint treatment.

- B Panel Application**—After tub, shower pan or receptor is installed, place temporary $\frac{1}{4}$ " spacer strips around lip of fixture. Pre-cut board to required sizes and make necessary cut-outs. Fit ends and edges closely but not forced together. Install board abutting top of spacer strip. Stagger end joints in successive courses. Fasten boards to wood studs spaced max. 16" o.c. and bottom plates with $1\frac{1}{4}$ " DUROCK Wood Screws or $1\frac{1}{2}$ " galvanized roofing nails spaced 8" o.c. Fasten boards to steel studs spaced max. 16" o.c. and bottom runners with $1\frac{1}{4}$ " DUROCK Steel Screws spaced 8" o.c. with perimeter fasteners at least $\frac{3}{8}$ " and less than $\frac{5}{8}$ " from ends and edges. In double-layer walls where cement boards are installed over base-layer gypsum boards, apply a water barrier (not a vapor retarder) over gypsum boards.

3.3 Counter Tops

- A Base**—Install min. $\frac{1}{2}$ " exterior grade plywood base across wood cabinet supports spaced max. 16" o.c. Position ends and edges over supports.

- B Panel Application**—Laminate $\frac{5}{16}$ " DUROCK Underlayment to plywood using ceramic tile adhesive, latex fortified mortar or thin-set mortar mixed with acrylic latex additive applied to plywood with $\frac{1}{4}$ " square-notched trowel for thin set, $\frac{5}{32}$ " V-notched trowel for adhesive. Fasten to plywood with $1\frac{1}{4}$ " DUROCK Wood Screws or $1\frac{1}{2}$ " galvanized roofing nails spaced 8" o.c. in both directions and around edges; or with $\frac{1}{4}$ " x $\frac{7}{8}$ " galvanized staples spaced 4" o.c. in both directions and around edges.

$\frac{1}{2}$ " and $\frac{3}{8}$ " DUROCK Cement Board—Same procedure as DUROCK Underlayment except fastening with staples is not permitted.

3.4 Ceilings

- A Framing**—Ceiling joists, furring channels or strips must be spaced max. 16" o.c. Framing must be capable of supporting the total ceiling system dead load, including insulation, ceramic tile, bonding materials and cement board, with deflection not exceeding L/360 of the span. When steel framing is used, min. 20-ga. is required.

- B Panel Application**—Apply $\frac{1}{2}$ " DUROCK Cement Panel to framing with long dimension across framing. Center end or edge joints on framing and stagger joints in adjacent rows. Fit ends and edges closely, but not forced together. Fasten boards to steel framing with $1\frac{1}{4}$ " DUROCK Steel Screws spaced 6" o.c. and to wood framing with $1\frac{1}{4}$ " DUROCK Wood Screws spaced 6" o.c. with perimeter fasteners at least $\frac{3}{8}$ " and less than $\frac{5}{8}$ " from ends and edges. If necessary, provide additional blocking to permit proper attachment. Edges or ends parallel to framing shall be continuously supported.

3.5 Wall Shield

- A Furring**—Cut ½" DUROCK Cement Panel to panel and furring strip sizes with a scoring tool. Attach a double layer of furring strips to wall framing with 2¼" DUROCK Wood Screws or 2¼" galvanized roofing nails with ¾" minimum framing penetration.
- B Panel Application**—Attach ½" DUROCK Cement Panel wall shield through furring to wall framing with 2¼" galvanized roofing nails with ¾" minimum framing penetration.

3.6 Floor Protector

- A Panel Application**—Apply ⅛" to ¼" thick latex-fortified portland cement to solid surface—never on top of carpeting or padding. Attach ½" DUROCK Cement Panel with 1¼" DUROCK Wood Screws or 1½" galvanized roofing nails at 8" o.c. both directions and with ¾" minimum flooring penetration.
- B Hearth Extension**—To substitute DUROCK Cement Panels in hearth extension designs, use the guidelines specified by local building code, fireplace manufacturer and the following formula:
- | | | | | |
|-------------------------------------|---|--|---|---|
| k-value DUROCK
k-value specified | x | Hearth extension
thickness
(specified) | = | Thickness of DUROCK
cement panels (not less
than hearth extension
thickness specified) |
|-------------------------------------|---|--|---|---|

Example: If the fireplace manufacturer or code requires one layer of ¾" millboard with a k-value of .84, use the formula as follows to determine the required layers of DUROCK Cement Panels:

$$\frac{1.92}{.84} \times .75 = 1.71" \text{ of DUROCK or four layers}$$

Installation of panels for hearth extension is same as 3.6.A.

3.7 Joint Treatment Application

- A For Tile and Thin Brick**—Prefill all DUROCK Cement Panel joints, and joints where DUROCK Cement Panels abut other panels or surfaces such as gypsum board, with tile-setting mortar or adhesive and then immediately embed tape and level the joints. As an alternative, apply DUROCK Interior Tape over the joints and then apply tile-setting mortar or adhesive, forcing it through the tape to completely fill and level the joints. This may require several passes to accomplish.
- B For Dry Untiled Areas**—For small areas where the DUROCK Cement Panel will not be tiled, such as a board extending beyond the tiled area and abutting another surface, treat joints as follows. Seal DUROCK Board with DUROCK or Type I Ceramic Tile Adhesive. (Mix four parts adhesive with one part water.) Embed SHEETROCK Joint Tape over joints and treat fasteners with SHEETROCK Setting-Type Joint Compound (DURABOND 45 or 90) applied in conventional manner. Flat trowel SHEETROCK Setting-Type Joint Compound over board to cover fasteners and fill voids to a smooth surface. Finish joints with at least two coats SHEETROCK Ready-Mixed Joint Compound. Do not apply ready-mixed or setting-type joint compound over unsealed board.
- C For Exterior Finish**—For USG Exterior Finish System, prefill joints with USG Exterior Basecoat and then immediately embed 4" tape and level the joints. As an alternative, apply DUROCK Exterior Tape over joint and then apply DUROCK Exterior Basecoat, forcing it through tape to completely fill and level joints. This may require several passes.

3.8 Interior Ceramic Tile Application

- A Tile Application**—Plan tile layout, then spread DUROCK Ceramic Tile Adhesive with trowel recommended by tile manufacturer held at 45° angle. Apply no more adhesive than can be covered in 20-30 mins. Open time will vary according to temperature and humidity. NOTE: When applying over old ceramic tile, allow adhesive to set 10-15 mins. before applying new tile. Wall tiles may be set top down or bottom up. Press, do not slide, tiles and sheets of tile into adhesive. Maintain accurate joint alignment and spacing as tiles are positioned. Use wooden or rubber-faced beating block tapped lightly with a mallet to level and ensure

solid tile positioning. Check occasionally to ensure at least 95% adhesive transfer to back of tile. Avoid adhesive squeeze-up between tiles. It may be necessary to butter adhesive on backs of large pavers and quarry tile. NOTE: Contractors installing ceramic tile should always follow ANSI Specifications and TCA Guidelines. Do not use DUROCK or Type I Ceramic Tile Adhesive for the installation of button back tile, slate, marble and floor tiles over 8"x8"; instead, use DUROCK Latex Fortified Mortar.

- B Recommended Adhesive and Mortar Coverage**—Recommended adhesive and mortar coverage will vary based on the substrates and notched trowel sizes commonly recommended by the tile or adhesive manufacturer.
- C Drying Time**—Do not walk on floors for at least 48 hrs. unless walking boards or plywood sheets are used. To finish job, wait 24 hrs. after tile has been installed for walls and counter tops, 48 to 72 hrs. for floors, before grouting.
- D Grouting**—Select, prepare and install grout in accordance with recommendations provided by grout manufacturers.

3.9 USG Exterior Finish System

- A Basecoat**—Apply a ⅛" minimum thick, uniform layer of USG Exterior Basecoat or USG Exterior Ready-Mixed Basecoat over the entire surface after joints and trim have cured a minimum of 4 hours. Allow USG Exterior Ready-Mixed Basecoat to dry 24 hours. Apply material by tightly scratching in an initial coat, then doubling up the ⅛" thickness. Do not add sand or other additives. Use USG Exterior Basecoat—Fiber-Reinforced to fill voids and depressions up to ¼". Do not apply material greater than ⅛" thick in a single application. Leave surface smooth and flat. Under rapid drying conditions, dampen surface as necessary to improve workability. Allow basecoat to cure 24 hours before application of USG Exterior Textured Finish coat.
- B Finish Coat**—Trowel-apply USG Exterior Textured Finish in a ⅛" minimum thick, uniform layer over all basecoated surfaces. Do not add sand or other additives to create heavier textures (material is not designed for texture heavier than ⅜"). If necessary, adjust consistency and working properties by adding up to 8 oz. clean water per 67.5 lb. pail of finish material. Add the same amount of water to all subsequent pails to ensure color uniformity. Mix well for uniform consistency. Texture as required, using plastic or wood floats.
- C Spray Application**—For information on spray application of basecoat and finish, contract your local representative.

Product Information and Literature: 1-800-USG-4YOU (1-800-874-4968).

Sales Offices: **Arizona:** Phoenix, (602) 866-0795 • **California:** Fremont, (510) 792-4400, Glendale, (818) 956-1882 • **Florida:** Jacksonville, (904) 764-3293, Miami, (305) 557-4501 • **Georgia:** Atlanta, (404) 393-0770 • **Hawaii:** Honolulu, (808) 591-8815 • **Illinois:** Chicago, (312) 606-5488 • **Indiana:** Indianapolis, (317) 848-1513 • **Louisiana:** New Orleans, (504) 241-2020 • **Maryland:** Baltimore, (410) 355-2200 • **Massachusetts:** Charlestown, (617) 241-8530 • **Michigan:** Southfield, (313) 569-1900 • **Minnesota:** Bloomington, (612) 854-4233 • **Missouri:** St. Louis, (314) 349-0980 • **New York:** Albany, (518) 458-7437, Stony Point, (914) 786-2820 • **North Carolina:** Charlotte, (704) 552-7402 • **Ohio:** Cleveland, (216) 899-7333 • **Oregon:** Beaverton, (503) 626-8864 • **Pennsylvania:** Philadelphia, (410) 355-2200, Pittsburgh, (800) 289-4874 • **Tennessee:** Nashville, (615) 361-8419 • **Texas:** Dallas, (214) 490-0771, Houston, (713) 868-9937 • **Utah:** Salt Lake City, (801) 266-4975 • **Virginia:** Richmond, (804) 285-7528 • **International Division:** Chicago, (312) 606-5840.

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Notice: We shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Our liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered.

Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

United States Gypsum Company

125 South Franklin Street
P.O. Box 806278
Chicago, Illinois 60680-4124
A Subsidiary of USG Corporation
SA-932/1-94 Printed in U.S.A.

Texture and Finish Products

Texture Finishes to Enhance Wall and Ceiling Esthetics

Benefits

Versatile Textures and Patterns

Wide variety of possible texture patterns to provide distinctive interior styling. Virtually any esthetic effect can be achieved.

Economical

Fast, easy application; quick drying. Also hides minor surface blemishes to reduce surface preparation needed. Saves labor time to preserve job profits.

High Quality and Consistent Performance

Special formulations provide durable, uniform finishes; predictable results. Full range of texture finishes reflects decades of research and testing, both in the laboratory and the marketplace.

Unit Responsibility

Use of texture finish products from U.S. Gypsum Company brings the important advantage of dealing with a single manufacturer for the components of the finished wall or ceiling.



USG Acoustical Finish provides a beautiful, monolithic, sound-absorbing ceiling.



SHEETROCK First Coat provides uniform look to paint finish even in direct, natural lighting.

A Superior Finish Depends on Good Surface Preparation

SHEETROCK First Coat—a flat latex basecoat paint formulated to provide a superior first (prime) coat over interior gypsum board and concrete surfaces. Equalizes differences between the porosity and texture variations of gypsum board face paper and finished joint compound to minimize decorating problems such as "joint banding." Approved for use as an additive to USG texture products. Applies with brush, roller or spray equipment. Dries to a white finish in less than 30 minutes; topcoat within an hour. Not intended as a final coating—should be overpainted when dry. Available ready-mixed or in powder form—mixed with water at jobsite. Covers approximately 300 to 500 sq. ft. per gallon.

Interior Texture Finishes

USG Acoustical Finish—an exclusive spray finish for interior gypsum panel, concrete and basecoat plaster ceilings. Asbestos-free, for use in new construction and renovation. Provides a natural-white, evenly-textured, sound-rated finish. For non-contact surfaces only. Surface burning characteristics: flame spread 10, smoke developed 25. Sound rated: NRC .50 for gypsum panels, .55 for concrete and .55 for conventional plaster at ½" finish thickness; .75 for concrete and conventional plaster at 1" finish thickness.

IMPERIAL QT Spray Texture Finish—aggregated non-asbestos powder, produces acoustical finish appearance on ceilings; provides no acoustical correction. Excellent bonding qualities; helps conceal minor surface defects. Formulated with polystyrene aggregate for spray application in super-coarse, coarse, medium or fine textures. White only. Surface burning characteristics: flame spread 5, smoke developed 0 for polystyrene-aggregated formulation applied over SHEETROCK brand Gypsum Panels. Limitation: not recommended for use where constant humid conditions exist.

USG Latex Additive—latex emulsion for use with IMPERIAL QT Spray Texture Finish. Provides increased bond and surface hardness when added to wet-mix at a rate of 1 to 2 pints per bag of Finish.

USG Spray Texture Finish—a top performance, non-asbestos powder product, available aggregated or unaggregated. Fast drying; offers good concealment and superior coverage. Produces light spatter, spatter/knockdown and orange peel finishes with machine spray. Highly effective on sidewalls and ceilings. Tinting not recommended; readily overcoated with most wall paints. Not washable unpainted.

SHEETROCK Wall and Ceiling Spray Texture (TUF TEX)—unaggregated texture coating designed for application over properly prepared interior surfaces. Produces a variety of texture patterns from bold spatter/knockdown to light orange peel. Dries to a hard, white finish. Helps conceal minor substrate defects. Apply with brush, roller or spray equipment. Not intended as a final coating—should be overpainted when dry. Not washable unpainted.

USG Multi-Purpose Texture Finish—an economical, unaggregated, non-asbestos powder product for producing light to medium-light textures on drywall or other interior surfaces. Textured effect obtained by brush, roller or spray application. Helps conceal minor surface defects. Dries to a soft-tone white finish. Should be overpainted on walls, may be left unpainted on ceilings when an adequate amount of material is applied to provide sufficient hiding properties. Not washable unpainted.

USG Texture XII Drywall Surfer—a non-asbestos powder product, mixed with water, for fast, low-cost spray application to interior gypsum drywall surfaces. Aggregated for sand finish. Combines easy mixing, fast drying, excellent coverage and good

concealment. An ideal base for wall paints; may be left unpainted on ceilings when an adequate amount of material is applied to provide sufficient hiding properties. Not washable unpainted.

USG QUIK & EASY Ready-to-Use Wall and Ceiling Texture—white, non-asbestos, latex-type material for interior surfaces, offers extra thickness with the speed of a ready-mixed formulation and a one-coat application. Develops a durable surface with minimal to no fissuring. Excellent hiding over gypsum panels, concrete, primed plaster, masonry and non-staining wood surfaces. Can be job-mixed with a variety of aggregates for greater coverage and applied with brush, roller, spray or trowel for a range of texture effects. Should be overpainted on walls. Not washable unpainted.

SHEETROCK All Purpose Joint Compound (Powder)—easy-mixing, smooth-working product that can be used to produce attractive light to medium-light textures. Non-asbestos powder mixed with water. Color is white but may vary in degree of whiteness. Surfaces should be painted. Not washable unpainted. Hand-applied with brush, roller or trowel.

SHEETROCK Topping or All Purpose Joint Compound Ready-Mixed—virtually ready to use, these products will produce textures ranging from light to medium depending upon method of application. (SHEETROCK Ready-Mixed Topping Joint Compound is not recommended for texturing in all areas; check local sales office for suitability of formula for texturing in your area). Color is white but may vary. Surfaces should be painted. Not washable unpainted. Hand-applied with brush, roller or trowel.

COVER COAT Compound—a vinyl-base product, designed for filling and smoothing monolithic concrete ceilings and columns located above grade—no extra bonding agent needed. Supplied in ready-mixed form (sand can be added), easily applied with drywall tools in two or more coats. Dries to a fine white surface usually making further decoration unnecessary on ceilings. **Limitations:** not to be applied over moist surfaces or surfaces likely to become moist (by condensation or otherwise); on ceiling areas below grade; on surfaces that project outside the building, or on other areas that might be subject to moisture, freezing, efflorescence, pitting or popping. Not washable unpainted.



IMPERIAL QT Spray Texture: Coarse finish



USG Multi-Purpose Texture Finish: Light stipple finish



USG QUIK & EASY Wall and Ceiling Texture: Extra thick finish



USG Spray Texture Finish: Spatter-knockdown finish



SHEETROCK Wall and Ceiling Spray Texture (TUF TEX): Spatter finish



Typical sand-effect finish obtained with aggregated Texture XII Drywall Surfer. In application, fan technique is used on walls, cross-spray on ceilings.



Simple roller-applied texture is obtained with SHEETROCK Topping or All Purpose Joint Compound Ready-Mixed. Same products thus can be used for both joint finishing and texturing on job.

The most common causes of finish failures on interior surfaces are: (a) Base surface not dry; (b) Surface improperly cleaned and patched; (c) Variable suction in the base; (d) Failure to use proper treatment for different surfaces, conditions, and finishes. It is estimated that 75% of interior finish failures are due to neglected or improper preparation before the finish container was opened.

Satisfactory results with these finish products, as with all finishes, depend upon good job practices:

- 1 Surfaces to be finished must be clean, dry, sound; free of grease, oil, wax, dust or other foreign matter; free of flaking, crumbling or chalking conditions; must be properly prepared.
- 2 Before texturing, apply a prime coat of SHEETROCK First Coat or a good quality, white interior latex flat wall paint with high solids content.
- 3 Atmospheric and structural temperatures must be 55°F minimum during and after application (until building is occupied). Unvented gas or oil heaters should not be used. Provide adequate ventilation at all times for proper drying.
- 4 Finishes of the water-thinned type should not be used over wallpaper having water-soluble colors. Must be protected from freezing.

- 5 New unpainted plaster (except veneer plaster), stucco, poured concrete, patches in masonry surfaces must age 60 days minimum prior to paint application.

Any other limitations are stated in the label directions for the texture product used.

- 6 Heavy water-based textures may result in sagging of gypsum board ceilings under these conditions: high heat and humidity, improper ventilation and/or board application to framing and insufficient board thickness for span between supports. Application of a primer equalizes surface porosity and provides a uniform color. Primers are not intended to reduce sag potential. When using water-based textures, refer to the following table:

Board thickness (in.)	Ceiling application method (long edge relative to frame)	Maximum frame spacing o.c. (in.)
3/4"	Not Recommended	—
1/2"	Perpendicular Only	16*
3/8"	Perpendicular Only	24

Note: Double layer laminated, 3/4" or greater total thickness—24" o.c.

*If 1/2" SHEETROCK brand Interior Gypsum Ceiling Board is specified, maximum frame spacing is 24" o.c.

Selector Guide

Type of finish	Surface priming preparation	Finish product	Method application	Drying time (hours)		Coverage (sq. ft.)
				Touch	Recoat	
INTERIOR WALLS						
Medium stipple, orange peel	SHEETROCK First Coat or flat, latex paint	USG Multi-Purpose Texture Finish	B,R,S	2	24	10-20/lb.
Spatter, spatter/knockdown, light orange-peel	SHEETROCK First Coat or flat, latex paint	USG Spray Texture Finish—Unaggregated	S	2	24	up to 40/lb
Medium stipple, orange peel, spatter, spatter/knockdown	SHEETROCK First Coat or flat, latex paint	SHEETROCK Wall and Ceiling Spray Texture (TUF TEX)	S1, R2, B2	2	24	10-40/lb
Sand-finish effect	SHEETROCK First Coat or flat, latex paint	USG Texture XII Drywall Surfer or USG Spray Texture Finish—Aggregated	S	2	24	20-35/lb
Light to medium textures	SHEETROCK First Coat or flat, latex paint	SHEETROCK All Purpose Joint Compound (Powder)	R,B,T	2	24	varies
Light to medium textures	SHEETROCK First Coat or flat, latex paint	SHEETROCK Topping or All Purpose Joint Compound Ready-Mixed	R,B,T	2	24	varies
Stipple, knockdown, light to heavy textures	SHEETROCK First Coat or flat, latex paint	USG QUIK & EASY Ready-to-Use Wall and Ceiling Texture	B,R,S,T	2	24	26-70/gal.
Stipple flat finish, fog spray, spatter spray, orange-peel	SHEETROCK First Coat or flat, latex paint	COVER COAT Compound	B,R,S	2	24	1.5-2/lb
INTERIOR CEILINGS						
Acoustical treatment	SHEETROCK First Coat	USG Acoustical Finish	S	24-28	3-4 days	.75-3.0/lb
Full aggregate look	SHEETROCK First Coat or flat, latex paint	IMPERIAL QT Spray Texture Finish (polystyrene/E-Z spray super coarse)	S	2	24	up to 8/lb
Aggregate look	SHEETROCK First Coat or flat, latex paint	IMPERIAL QT Spray Texture Finish (polystyrene/E-Z spray coarse) (polystyrene/coarse)	S	2	24	up to 8/lb
Aggregate look	SHEETROCK First Coat or flat, latex paint	IMPERIAL QT Spray Texture Finish (polystyrene/E-Z spray medium) (polystyrene/medium)	S	2	24	up to 8/lb
Aggregate look	SHEETROCK First Coat or flat, latex paint	IMPERIAL QT Spray Texture Finish (polystyrene/E-Z spray fine)	S	2	24	up to 8/lb
Stipple, swirl and medium-light textures	SHEETROCK First Coat or flat, latex paint	USG Multi-Purpose Texture Finish	B,R,S	2	24	10-20/lb
Spatter, spatter/knockdown light orange-peel	SHEETROCK First Coat or flat, latex paint	USG Spray Texture Finish—Unaggregated	S	2	24	up to 40/lb
Medium stipple, orange peel, spatter, spatter/knockdown	SHEETROCK First Coat or flat, latex paint	SHEETROCK Wall and Ceiling Spray Texture (TUF TEX)	S1, R2, B2	2	24	10-40/lb
Sand-finish effect	SHEETROCK First Coat or flat, latex paint	USG Texture XII Drywall Surfer or USG Spray Finish—Aggregated	S	1	24	20-35/lb
Stipple, swirl, light to heavy textures	SHEETROCK First Coat or flat, latex paint	USG QUIK & EASY Ready-to-Use Wall and Ceiling Texture	B,R,S,T	2	24	26-70/gal.
Stipple flat finish, fog spray, spatter spray, orange-peel	SHEETROCK First Coat or flat, latex paint	COVER COAT Compound	B,R,S	2	24	1.5-2/lb

NOTES: "Drying Time" estimates are based on average conditions. Touch = furniture can be returned to living areas. Abbreviations, Methods of Application: B = brush, R = roller, S = spray, T = trowel, O = other; 1, 2, 3 = order of preference. "Coverage" provides a relative comparison between products applied according to directions; not recommended for job estimating. Coverage can vary widely depending on substrate conditions, mixing proportions, application procedures and texture appearance desired. Primers are not intended to reduce sag potential or to prevent stains or contaminants from migrating to the finished surface.

Part 1: General

1.1 Scope—Specify to meet project requirements.

1.2 Qualifications

All materials, unless otherwise indicated, shall be applied in accordance with its current printed directions.

1.3 Submittals

Upon request, the contractor shall provide samples prepared in advance with the specified materials which, when approved, shall be the standards of finish to be provided on this project.

1.4 Delivery and Storage of Materials

- A** All materials shall be delivered in their original unopened containers bearing the manufacturer's name, brand name and directions for use.
- B** All containers shall be kept tightly closed when in storage, stored at moderate temperatures and protected from damage by tampering and exposure to the elements.

1.5 Environmental Conditions

During cold weather, thermostatically controlled heat shall be provided to maintain 55°F minimum temperature during and after application until building is occupied. Unvented gas or oil heaters shall not be used to provide heat. Adequate ventilation shall be provided at all times for proper drying.

Part 2: Products**2.1 Materials**

(Specify surface treatment and finish materials from product descriptions and Selector Guide in this catalog.)

2.2 Mixing and Equipment

Mix texture finish products with water only as directed by manufacturer. Do not overdilute. Use spray equipment of a size and type to assure acceptable results.

Part 3: Execution

Note to architect: Where more detailed specification is desired, select from applicable product data sheet.

3.1 Surface Preparation

All surfaces, including joint compound applications, filling or patching treatments, shall be dry, clean and sound. Remove any water-soluble materials from surface. Dull or roughen any glossy surfaces. Prime metal surfaces with a rust-inhibitive primer. Fill and seal any exposed wood surfaces.

Allow new concrete ceilings and any new concrete patches or repairs to age at least 60 days before applying texture finishes. Remove form oils or parting materials, efflorescence, grease and other deposits from concrete surfaces. Finish patched or repaired areas to provide a uniform texture and surface.

Grind down any ridges or other protrusions resulting from forms or other causes to the same level as adjacent surfaces; remove all grinding sludge or dust. If filling is required, apply a SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound, or COVER COAT Compound. Apply in as many coats as are needed to provide a level, crack-free fill without edge joinings that show through decoration.

Exercise special care to provide a smooth, level surface, free of irregularities, in areas that will be exposed to sharply angled lighting.

In drywall construction, treat joints and fastener heads with a joint system manufactured by United States Gypsum Company, following manufacturer's instructions. Smooth and fill any scratches or scuffs in gypsum drywall surfaces.

When all surfaces are prepared and dry, apply a full coat of SHEETROCK First Coat or a good-quality, undiluted white interior latex flat wall paint with high solids content over entire surface. Allow to dry.

3.2 Application

Apply at a coverage rate not to exceed directions printed on container. Apply material to blend uniformly and cover fully without starved spots or other evidence of thin application. Provide uniform texture without application patterns. Remove any texture droppings or overspray from walls, windows and floor, leaving room clean for following trades.

Product Information and Literature: 1-800-USG-4YOU (1-800-874-4968).

Sales Offices: **Arizona:** Phoenix, (602) 866-0795 • **California:** Fremont, (510) 792-4400, Glendale, (818) 956-1882 • **Florida:** Jacksonville, (904) 764-3293, Miami, (305) 557-4501 • **Georgia:** Atlanta, (404) 393-0770 • **Hawaii:** Honolulu, (808) 591-8815 • **Illinois:** Chicago, (312) 606-5488 • **Indiana:** Indianapolis, (317) 848-1513 • **Louisiana:** New Orleans, (504) 241-2020 • **Maryland:** Baltimore, (410) 355-2200 • **Massachusetts:** Charlestown, (617) 241-8530 • **Michigan:** Southfield, (313) 569-1900 • **Minnesota:** Bloomington, (612) 854-4233 • **Missouri:** St. Louis, (314) 349-0980 • **New York:** Albany, (518) 458-7437, Stony Point, (914) 786-2820 • **North Carolina:** Charlotte, (704) 552-7402 • **Ohio:** Cleveland, (216) 899-7333 • **Oregon:** Beaverton, (503) 626-8864 • **Pennsylvania:** Philadelphia, (410) 355-2200, Pittsburgh, (800) 289-4874 • **Tennessee:** Nashville, (615) 361-8419 • **Texas:** Dallas, (214) 490-0771, Houston, (713) 868-9937 • **Utah:** Salt Lake City, (801) 266-4975 • **Virginia:** Richmond, (804) 285-7528 • **International Division:** Chicago, (312) 606-5840.

Cautions:

Refer to product packaging or product data sheet for a list of product ingredients. Inhalation of dust may cause irritation of the upper respiratory system. Long term overexposure to mica or talc may cause lung damage. When handling this product avoid creating dust. If dust is created use dust collector or wear a respirator approved by NIOSH. Use of safety glasses is recommended. Do not take internally. KEEP OUT OF REACH OF CHILDREN.

Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

Trademarks: The following trademarks used herein are owned by United States Gypsum Company or a related company: USG, IMPERIAL, SHEETROCK, QUIK & EASY, COVER COAT, TUF-TEX, DURABOND, EASY SAND.

Notice: We shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Our liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered.

Metric Specifications: USG Corporation, through its operating subsidiaries, will provide metric conversions on its products and systems to help specifiers match metric design sizes. In addition, some products are available in metric dimensions from selected manufacturing plants. Refer to SA-100 Construction Selector for additional information and a Table of Metric Equivalents.

United States Gypsum Company

125 South Franklin Street

P.O. Box 806278

Chicago, Illinois 60680-4124

A Subsidiary of USG Corporation

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Wall Systems

S A 1 0 2 0

USG Interiors, Inc.



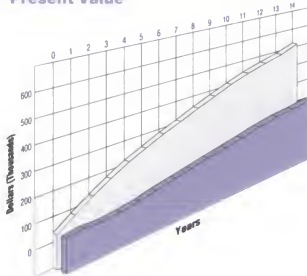
USG

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6	Tackwall Panels
7	The Learning Wall
8	Donn® High Performance Wall
10	Architectural Specifications

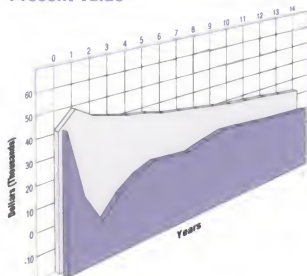
Life Cycle Costs

Typical Commercial Construction
Present Value



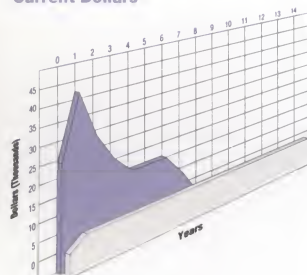
Cash Flow

Typical Commercial Construction
Present Value



Depreciation

Typical Commercial Construction
Current Dollars



■ Relocatable wall system
□ Standard drywall partitions

Relocatable Walls

Relocatable walls are the flexible, affordable, high performing, and environmentally sensible alternative to fixed drywall. Over the complete life-span of a building, relocatable walls cost less than fixed wall systems.

Relocatable walls can bring significant savings in three basic ways.

Initial construction

Relocatable walls require no wet work—taping, joint treatment, painting or field application of wall coverings.

Prefinished panels allow faster completion and earlier occupancy.

Floor coverings and ceiling systems can be installed continuously.

Reconfiguration

Fast disassembly and reassembly minimize the disruption and expense of frequent office moves.

Moving relocatable walls is 40 percent less expensive than moving fixed walls.

Relocatable walls can be moved without damage to adjoining carpeting and ceiling tile.

There is no need to rearrange wiring patterns once they're in the wall.

Eliminates hauling and landfill costs incurred with waste from fixed drywall.

Tax savings

Under the modified accelerated cost recovery schedule (ACRS), relocatable walls are depreciated over only seven years. Fixed partitions are depreciated over 31½ years. Your tax advisor can assist you in determining the financial advantages specific to a particular tax situation.

ULTRAWALL Partition System

- Elegant simplicity
- Economy
- Superior STC performance—without additional cost
- Superior fire ratings

DONN High Performance Wall

- Versatility
- Durability
- Point accessibility
- Special finish options for special performance requirements

TACKWALL Panels

- Tackable, full-height wall panels

The LEARNING WALL

- Abuse-resistant system with integral chalkboard, marker board, tackboard and projection screen surfaces



Ultrawall Partition System

The ULTRAWALL partition system is the best choice for most office settings.

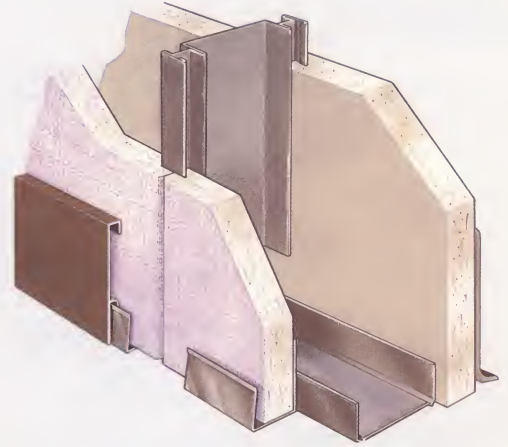
Only four basic components are used to build the ULTRAWALL system.

ULTRAWALL Features

Cavity width	17/8"
Wall width	33/8"
STC rating	42 ⁽¹⁾
Fire rating	1 hour ⁽¹⁾
Flame spread/smoke developed (vinyl)	Class A

(1) Ultrawall partitions can be modified to meet more stringent fire and sound requirements. Standard one-hour fire rating does not apply to aluminum studs. See ULTRAWALL Partition System Technical Information Guide, MP-517, for complete test data.

Note: For detailed technical drawings, component data and assembly information, contact your representative for ULTRAWALL Partition System Technical Information Guide, MP-517 and/or ULTRAWALL Partition System Planning, Installation and Maintenance Guide, MP-501.



The ULTRAWALL system is ideal for settings that require beautiful appearance, generous glazing, and excellent sound and fire performance.



Ultrawall Partition System

1

ULTRAWALL Components

Panels

Gypsum Panels	3/4" x 24", 30". Factory kerfed, bevel edge to fit stud.
TACKWALL Panels	3/4" x 24", 30". Factory kerfed, bevel edge.

Studs

Steel	Roll-formed galvanized steel "H" or "T" configuration.
Aluminum	Extruded aluminum "H" or "T" configuration.

Ceiling Track

Steel	3 5/8" width, 1 1/4" return. Painted.
Aluminum	Flanged rail (ARL-300) or plain rail (ARL-301). 3 5/8" width, 1 1/4" return. Satin anodized, ULTRABRONZE or painted.

Floor Runner

Steel	Galvanized steel. 1 7/8" width, 1 1/8" return.
-------	---

1 Basic ULTRAWALL System

2 ULTRAWALL system with half-lite glazing.

2



Fast Assembly

Ceiling track and floor runner are installed first. Then studs engage into the kerfed edges of gypsum panels to align panels.

Wire Management

Wiring for utilities, telecommunications and computer systems can run either vertically or horizontally in the wall.

Flexibility

Door openings, side-lites and glass walls can be located at any point along the wall. T- or H-studs accommodate different panel configurations or finishes on opposite sides of the wall.





3 ULTRAWALL system with full-height glazing and intersecting corner sidelites.

4 ULTRAWALL system with full-height glazing, trim and mullions.

Finish Selection

Nine fabric lines and six vinyl styles in dozens of colors are standard. Optional flush outside corners and trimless inside corners enhance the monolithic look. Call Customer Relations at 1-800-874-9255 for material samples.

Fire and Sound Insulation

THERMAFIBER® sound attenuation fire blankets can be placed in the wall cavity to increase sound and fire ratings. THERMAFIBER blankets are paperless, semi-rigid, mineral fiber mat 24"x48" in 1" or 1½" thickness.

ULTRAWALL Accessories

Door Frames

Aluminum	SMR-Delta. Self mortising, reversible. Satin anodized, ULTRABRONZE or painted.
Steel	Throated for installation without regard to module. 6'8", 7'0" mortised for 1½ pair of 4½" x 4½" butt hinges and standard A-115.1 strike, or full height mortised for 2 pair hinges. Non-handed, reversible (6'8" and 7'0" only). 1½ hr. Class B fire rating for 4'0" x 7'6" max. opening with metal-faced or gypsum panels. Withstands 1-million slam test. Painted.

Glazing

Aluminum	Nonmodular components (glass not included). Satin anodized, ULTRABRONZE or painted. Glazing covers to fit door jamb or rail. Snap-on glazing stops to fit H-rail.
Steel	Throated for installation without regard to module. Painted.

Floor Base

PVC	Vinyl snap-on base.
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Trims

Aluminum	Satin anodized, ULTRABRONZE or painted.
PVC	Vinyl extruded. Vinyl covered to match panels.

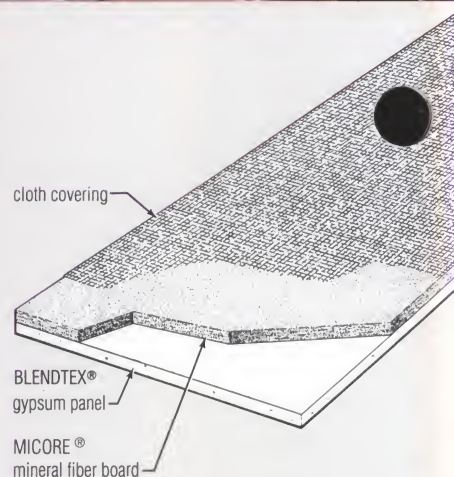
ULTRAWALL for Hanging Furniture (Systems/ULTRAWALL)

Hardware	Aluminum studs accept various standards for hang-on furniture in nominal 24", 30", 48", 54" and 60" widths. Interface standards mount directly to aluminum studs. Contact Customer Relations at 1-800-874-9255 for more information.
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TACKWALL panels are especially suitable for conference rooms, training areas, schools, libraries and presentation rooms. **TACKWALL** finish options complement the complete line of finishes for **ULTRAWALL** and **High Performance Wall** panels.

Tackwall Panels

TACKWALL panels integrate with **ULTRAWALL** and **High Performance Wall Systems** to provide flush, partial or full-height tackboards right in the wall. **TACKWALL** panels are simply substituted for regular relocatable wall panels, creating strategically placed tackable surfaces or a 100 percent tackable wall.





"THE LEARNING WALL" system offers sound control for room-to-room and room-to-corridor privacy and a one-hour fire rating to ensure safety.

The Learning Wall

Abuse-resistant LEARNING WALL panels keep maintenance to a minimum. Special performance finishes are available to keep classrooms and corridors looking move-in new. Integral teaching surfaces such as chalkboard, tackboard, marker board and projection screen take the place of costly separate units.



THE LEARNING WALL Components

Panels

Gypsum Panels	$\frac{3}{4}$ " x 24", 30". Factory kerfed, bevel edge to fit stud.
Tackable Panels	$\frac{3}{4}$ " x 24", 30". Factory kerfed, bevel edge.
Marker Board	$\frac{3}{4}$ " x 24", 30". Factory kerfed, bevel edge.
Chalkboard	$\frac{3}{4}$ " x 24", 30". Factory kerfed, bevel edge.

Studs

Steel	Roll-formed galvanized steel "H" or "T" configuration.
Aluminum	Extruded aluminum "H" or "T" configuration.

Ceiling Track

Steel	$3\frac{5}{8}$ " width, $1\frac{1}{4}$ " return. Painted.
Aluminum	Flanged rail (ARL-300) or plain rail (ARL-301). $3\frac{5}{8}$ " width, $1\frac{1}{4}$ " return. Satin anodized, ULTRABRONZE or painted.

Floor Runner

Steel	Galvanized steel. $1\frac{7}{8}$ " width, $1\frac{1}{8}$ " return.
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Horizontal Trim

Aluminum	Painted, extruded aluminum.
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Donn High Performance Wall System

The **DONN High Performance Wall** system is ideal for hot, humid or corrosive environments, clean rooms, laboratories, and industrial or marine settings. Only five basic components are used to build the standard **DONN High Performance Wall** system.

The **DONN High Performance Wall** system offers point accessible framing and specialty finishes to meet specific performance needs.

DONN High Performance Wall Features

Cavity width	2"
Wall width	3-3 1/4"
STC range (gypsum panels)	35-44
(metal-faced panels)	40-43
Fire rating	1 hour
Flame spread/smoke developed (vinyl)	Class A

Note: For detailed technical drawings, component data and assembly information, contact your representative for **DONN High Performance Wall** System Technical Information Guide, MP-574 and/or **DONN High Performance Wall** System Planning, Installation and Maintenance Guide, MP-585.

DONN High Performance Wall Components

Panels

Gypsum Panels 1/2" x 48".
5/8" x 24", 30", or 48".
Bevel edge.

TACKWALL Panels 5/8" x 24", 30". Bevel edge.

Attachment Impaled edge clip.

Metal-Faced Panels

24-gauge steel panel over
1/2" or 5/8" thick
gypsum core.
24" or 30" wide.
Square edge.

Attachment Spring steel clips attached to studs grasp arrowhead edge of metal panel facing.

Studs

Steel Roll-formed steel. 2" depth.
Holes punched for utility passage.
Locking stud extender allows adjustments for variation in floor to ceiling height.

Ceiling Track

Steel 3" or 3 1/4" wall width.
1 3/8" return. Painted.

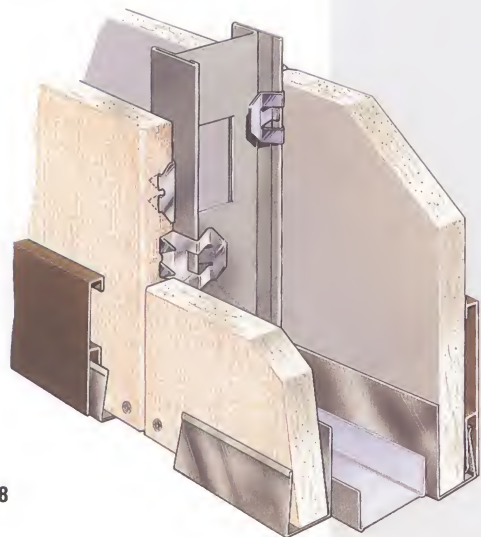
Floor Runner

Steel 2" width.
1" return.

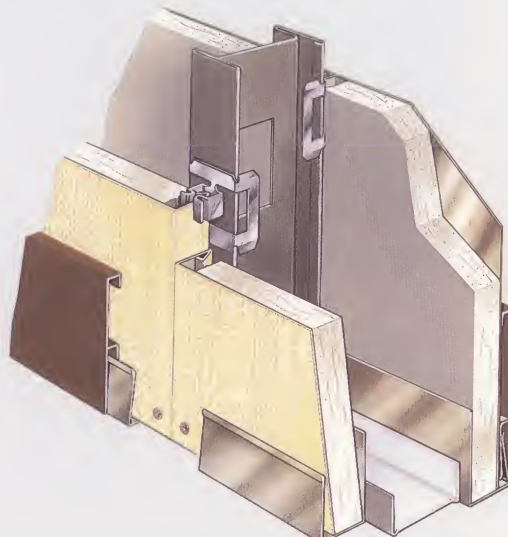
Spacer Channels (Optional)

Steel 24" or 30" lengths.

Gypsum Panels



Metal-Faced Panels



Point Accessibility

Point-accessible service cavities can be used to route, modify or maintain electrical wiring, communication lines and plumbing through the walls. Panels can be removed and replaced as needed. Snap-on panel design permits easy access without disturbing framework or adjacent panels.

Easy Installation

Walls are erected after ceilings and flooring are in place. Adjustable, interlocking components minimize field cutting. Studs adjust to varying ceiling heights, and standard stud facings allow flexible panel placement. Spacer channels lock into place on studs, giving additional stability and eliminating the need to measure. Panels attach directly to studs with field-applied clips. Wall system is able to compensate for building irregularities at floor and ceiling without cutting or shimming.

Finish Selection—

Gypsum and Metal-Faced Panels

Standard finishes include nine fabric lines and six vinyl styles in dozens of colors as well as baked enamel paint. Call Customer Relations at 1-800-874-9255 for material samples.

Specialty Finishes—

Metal-Faced Panels

Specialty finishes include stainless steel, baked enamel paint, powder paint, porcelain chalkboard, vinyl and custom laminates. Recommended for diverse functional requirements of health care facilities, research settings and plants. Call Customer Relations at 1-800-874-9255 for material samples.

Fire and Sound Insulation

THERMAFIBER sound attenuation fire blankets can be placed in the wall cavity to increase sound and fire ratings. THERMAFIBER blankets are paperless, semi-rigid, mineral fiber mat 24"x48" in 1" or 1½" thickness.



DONN High Performance Wall System Accessories

Door Frames

Aluminum	SMR-Delta. Self-mortising, reversible. Satin anodized, ULTRABRONZE or painted.
Steel	Throated for installation without regard to module. 6'8", 7'0" mortised for 1½ pair of 4½" x 4½" butt hinges and standard A-115.1 strike, or full height mortised for 2 pair hinges. Non-handed, reversible (6'8" and 7'0" only). 1½ hr. Class B fire rating for 4'0" x 7'6" max. opening with metal-faced or gypsum panels. Withstands 1-million slam test. Painted.

Glazing

Steel	Nonmodular components (glass not included). Throated for installation without regard to module. Painted.
-------	--

Floor Base

PVC	Vinyl snap-on base.
-----	---------------------

Trims

PVC	Vinyl extruded. Vinyl covered to match panels.
Steel	Painted.

Architectural Specifications

ULTRAWALL Partition System

Part 1—General

1.01 Related Work

A Related work specified elsewhere:

1. Conventional door and glass frames: Section_____.
2. Wood doors: Section_____.
3. Glazing: Section_____.
4. Finish hardware: Section_____.
5. Painting: Section_____.

1.02 System Description

- A Interior wall system: Partitions shall be bevel edge type, 3/4" thick. Wall centerlines are as shown on plans. System also provides door and glass frames, trims and base.

1.03 Quality Assurance

- A Wall system components shall be sourced from one manufacturer which certifies that materials meet or exceed these specifications.
- B Installing contractor: Installer shall have a history of completed jobs of similar size and scope. Contractor shall be registered and authorized by the manufacturer.
- C Sound transmission: Provide independent laboratory certification that wall system provides 42 STC without insulation (gypsum partitions tested in accordance with ASTM E90).
- D Fire protection: When required on drawings, provide independent laboratory certification that wall system has been successfully tested for 1-hour fire endurance and hose-stream in accordance with ASTM E119.
- E Structural: Provide transverse load rating and impact resistance tests.
- #### 1.04 Submittals
- A Samples: Submit finish and color samples.
- B Manufacturer's data called for in quality assurance section and finish performance data per Section 2.02B.
- C The partition contractor shall submit shop drawings for assemblies or conditions not fully described on working drawings.

1.05 Environmental Conditions

- A Temperature within the building shall be above a constant minimum of 65°F with relative humidity not over 70% during erection of a partition. When required, heat shall be furnished by the general contractor. Erection of the partition systems shall not begin until building exterior provides complete protection from the outside weather. Panels shall not be stored where they are subjected to temperature, moisture or humidity extremes.

1.06 Delivery, Storage and Handling

- A Prefinished materials shall arrive at job site in their original unopened cartons or other protective packaging necessary to protect finishes. Materials should be stored in such packages until time of application. Bulk items (studs and tracks) shall arrive in banded bundles for ease of handling and distribution. Panels shall arrive and remain on adequate support to ensure flatness and prevent damage.

Part 2—Products

2.01 Manufacturer

- A ULTRAWALL partition system as manufactured by USG Interiors, Inc., Chicago, IL.

2.02 Materials

- A Framing:
1. Roll-formed steel or extruded aluminum studs, as indicated on drawings, providing for attachment of gypsum panels and allowing for utility passage. Extruded aluminum studs shall be used for furniture attachment.
 2. Struts/runners shall be roll-formed galvanized steel to hold panels in alignment.
 3. Ceiling track of (steel) (aluminum) shall be designed to stabilize wall at ceiling, cover panel tops or provide for covering trim, and integrate with full-height door and glass framing.

B ULTRAWALL Panels:

1. ULTRAWALL panels shall be composed of factory kerfed gypsum board measuring 3/4" thick by (24") (30") wide by (9') (10') long.
2. ULTRAWALL panels shall be predecorated in manufacturer's standard vinyl or fabric. Panels shall be factory kerfed and bevel-edged for uniform joint appearance.
3. Finish performance data per the following schedule shall be made available prior to bid:
 - a Impact resistance (ASTM D2794).
 - b Flame spread (ASTM E84).

C THE LEARNING WALL Panels:

1. THE LEARNING WALL panels shall be composed of gypsum board measuring 3/4" thick by (24") (30") wide by (9') (10') long.
2. Panels shall be factory kerfed and bevel-edged for uniform joint appearance.
3. Panels shall be available in the following finishes:
 - a Fabric
 - b Vinyl
 - c Porcelain chalkboard
 - d Tackboard
 - e Marker board
 - f Painted
4. Finish performance data per the following schedule shall be made available prior to bid:
 - a Hardness (ASTM D3363)
 - b Adhesion (ASTM D3359)
 - c Impact resistance (ASTM D2794)

D Glazing components:

- Glazing shall be (aluminum) (steel) to integrate with runner, glazing and trim components. Glass furnished by others.

E Door frames:

- Door frames shall be (aluminum) (steel) to integrate with runner, glazing and trim components. Frames shall be (nonhanded reversible) (left and right handed) and mortised for (1 1/2") (2") pair of 4 1/2" x 4 1/2" butt hinges and standard A-115.1 strike unless otherwise noted. Doors by others.

- F Aluminum ceiling track, glazing and door frames shall be (satin anodized) (ULTRABRONZE anodized) (painted in manufacturer's standard colors). Steel ceiling track, glazing and door frames shall be painted in manufacturer's standard colors.

- G Base. Color of base shall be from manufacturer's standard colors.

H Trims:

- Trims shall be ([satin] [ULTRABRONZE] anodized) (painted) aluminum or painted steel to match other system components and made with (square-edge) (radiused) outside corners.

- I Furniture mounting hardware: Provide one interface standard assembly each side of wall mounted furniture. Interface standards to be painted to match furniture with touch up paint from furniture manufacturer.

- J Sound insulation shall be THERMAFIBER Sound Attenuation Fire Blankets, paperless, semi-rigid, spun mineral fiber mat (1") (1 1/2") 24" x 48".

Part 3—Execution

3.01 Inspection

- A Before stocking or installing materials, the contractor should inspect the building site to verify that floors and ceilings contain no defects which would result in a poor installation of the wall system. At this time, measurements should be taken to ensure correct installation.

3.02 Installation

- A Lay out partitions. Securely attach floor and ceiling runners. Accurately plumb strut studs at door openings and terminations.
- B Install ULTRAWALL panels, studs and trim members in accordance with USG Interiors, Inc. installation directions. Complete installation with vinyl base, door frames and trim.
- C Erect partitions to be rigid, plumb, with horizontal lines leveled, neat in appearance, and free from defects in workmanship. Conceal all connections to walls, floors, ceilings, cornice sections, and connections between gypsum panels. Adjust all hardware to proper working order.

For additional specifications and technical information, contact your USG Interiors representative at 1-800-874-9255.

DONN High Performance Wall System

Part 1—General

1.01 Related Work

- A Related work specified elsewhere:
1. Conventional door and glass frames: Section ____.
 2. Wood doors: Section ____.
 3. Glazing: Section ____.
 4. Finish hardware: Section ____.
 5. Painting: Section ____.

1.02 System Description

- A Interior wall system: Fully relocatable and point accessible. System consists of a framing system that will accept metal-faced or gypsum panels. Metal-faced and gypsum panels are interchangeable and may be applied adjacent to each other. System also provides door and glass frames, trims and base.

1.03 Quality Assurance

- A Wall system components shall be sourced from one manufacturer which certifies that materials meet or exceed these specifications.
- B Installing contractor: Installer shall have a history of completed jobs of similar size and scope. Contractor shall be registered and authorized by the manufacturer.
- C Sound transmission: Provide independent laboratory certification that wall system provides: ____STC gypsum partitions, and ____STC metal-faced partitions in accordance with ASTM E90.
- D Fire protection: When required on drawings, provide independent laboratory certification that wall system has been successfully tested for 1-hour fire endurance and hose-stream in accordance with ASTM E119.
- E Structural: Provide transverse load rating and impact resistance tests. Metal-faced panels shall be capable of supporting 1,000-lb. shelf load within the span of one panel without fastening standards to the framing system.

1.04 Submittals

- A Samples: Submit finish and color samples.
- B Manufacturer's data called for in quality assurance section and finish performance data per Section 2.02B.

- C The partition contractor shall submit shop drawings for assemblies or conditions not fully described on working drawings.

1.05 Environmental Conditions

- A Temperature within the building shall be above a constant minimum of 65°F with relative humidity not over 70% during erection of a partition. When required, heat shall be furnished by the general contractor. Erection of the partition systems shall not begin until building exterior provides complete protection from the outside weather. Panels shall not be stored where they are subjected to temperature, moisture or humidity extremes.

1.06 Delivery, Storage and Handling

- A Prefinished materials shall arrive at job site in their original unopened cartons or other protective packaging necessary to protect finishes. Materials should be stored in such packages until time of application. Bulk items (studs and tracks) shall arrive in banded bundles for ease of handling and distribution. Panels shall arrive and remain on adequate support to ensure flatness and prevent damage.

Part 2—Products

2.01 Manufacturer

- A DONN High Performance Wall System as manufactured by USG Interiors, Inc., Chicago, IL.

2.02 Materials

- A Framing:
1. Studs shall be 2" deep as indicated on drawings, punched for utility passage, and designated to accept metal-faced or gypsum panels. Studs shall lock to ceiling runner with a stud extender that allows up to 1½" in floor variation.
 2. Spacer channels shall be designed to lock studs in place, support electrical devices, carry power for signal cables, and provide abuse resistance for the panel surface.
 3. Ceiling track shall be designed to stabilize the wall at the ceiling, cover the tops of the panels, and integrate with full-height door and glass framing.

B Panels:

1. Gypsum panels shall be ½" x 48" or ¾" x 24", 30" or 48". Panels shall be predecorated in manufacturer's standard vinyl or fabric. Panels shall be bevel-edged for uniform joint appearance.
2. Metal-faced panels:
 - a Metal-faced panels shall be ½" or ¾" thick by 24" or 30" wide with gypsum core, plain-backed.
 - b Metal-faced panels shall be available in the following finishes:
 1. Painted
 2. Vinyl
 3. Porcelain chalkboard
 4. Stainless steel
 5. Fabric
 6. Powder paint
 - c Finish performance data per the following schedule shall be made available prior to bid:
 1. Hardness (ASTM D3363)
 2. Adhesion (ASTM D3359)
 3. Impact resistance (ASTM D2794)
 - d Metal-faced panel shall incorporate a panel bottom channel to add strength and to secure snap-on base.

C Glazing components:

Throated steel glazing components shall be available to be installed without regard to module.

D Door frames:

Throated steel door frames shall be available to be installed without regard to module. In the 6'8" and 7'0" configuration, frames shall be nonhanded, reversible, and carry a 1-1½-hour Class B fire rating. Throated door frames shall have achieved a slam test of one million cycles. Throated frames shall be formed of steel. Frames shall be mortised for 1½" pair of 4½" x 4½" butt hinges and standard A-115.1 strike unless otherwise noted on drawings. Full-height frames shall interface with ceiling runner and be mortised for two pair of 4½" x 4½" butt hinges.

- E Glazing and door frames shall be prefinished in manufacturer's standard color. Glass and doors by others.

- F Snap-on vinyl base shall be 3¼" high. Color of base shall be from manufacturer's standard colors.

G Trims:

1. Trims shall be selected from manufacturer's standard paint colors.
2. Outside corners shall be available in square-edge or radiused configurations to match panel finish.

Part 3—Execution

3.01 Inspection

- A Before stocking or installing materials, the contractor should inspect the building site to verify that floors and ceilings contain no defects which would result in a poor installation of the wall system. At this time, measurements should be taken to ensure correct installation.

3.02 Installation

- A Install partition framing and panels after floor coverings and suspended acoustical ceilings have been installed. Coordinate partition work with work of other trades which in any way affect partition installation. Avoid damage to installed work.
- B Furnish and install anchoring devices required, and secure partitions to floor and ceiling using concealed fastening devices which will not mar surfaces, such as clips and VELCRO® tape or foam tapes. Penetrating fasteners required only at door frames, finished ends, corners, glazing or where structurally necessary.
- C Install partitions rigid, level, plumb and in alignment with all components secured together, in accordance with manufacturer's instructions. Leave partitions complete, thoroughly clean, and in perfect condition.
- D Provide through posts to ceiling or other concealed supports, if required to assure lateral stability of partition runs.
- E Adjust hardware and leave doors in proper operating condition.

For additional specifications and technical information, contact your USG Interiors representative at 1-800-874-9255.

For further information . . .

Customer Relations Center

Westlake, OH
Office: (800) 874-9255
FAX: (216) 892-7496

Technical Services

USG Interiors Technical Services
1035 West Smith Road
Medina, OH 44256
Office: (216) 722-8773
FAX: (216) 764-6012

National Showroom

The Solutions Center
222 West Hubbard
Chicago, IL 60610
Office: (312) 822-3400

Area Sales Offices

South Pacific
500 North State College Blvd.
Suite 230
Orange, CA 92668
Office: (714) 978-0901
FAX: (714) 978-2579

Southwest
14643 Dallas Parkway
Suite 575, LB #78
Dallas, TX 75240
Office: (214) 490-0355
FAX: (214) 392-1505

Southeast
1000 Abernathy Road, N.E.
Suite 500
Atlanta, GA 30328
Office: (404) 396-9022
FAX: (404) 698-0769

Mid-Atlantic
1155 Connecticut Ave., N.W.
Washington, D.C. 20036
Office: (202) 467-8592
FAX: (202) 467-4924

Northeast
296 Temple Hill Road
Suite 100
New Windsor, NY 12553
Office: (914) 567-0059
FAX: (914) 567-0058

New York City
Office: (718) 937-7744
FAX: (914) 567-0058

Gulf Coast
5850 TG Lee Blvd.
Suite 310
Orlando, FL 32822
Office: (407) 851-9485
FAX: (407) 851-4434

Great Lakes
1000 Crocker Road
Westlake, OH 44145
Office: (800) 777-8744
FAX: (216) 892-7289

Chicago
1240 Iroquois Ave.
Suite 510
Naperville, IL 60563-8541
Office: (708) 355-7312
FAX: (708) 527-1841

Gateway
P.O. Box 4470
Chicago, IL 60680-4470
125 South Franklin Street
Chicago, IL 60606-4678
Office: (312) 606-4000
FAX: (312) 606-5490

North Pacific
7901 Stoneridge Drive
Suite 499
Pleasanton, CA 94566
Office: (510) 460-8470
FAX: (510) 460-8474

International Sales and Product Support

Australia
USG Interiors Australia (Pty.) Limited
Building 3, 203-215
Woodpark Road
Smithfield NSW 2164
Australia

Canada
CGC Interiors
735 Fourth Line
Oakville, Ontario
Canada L6L 5B7
Office: (800) 565-6607
FAX: (416) 803-5688

France/Portugal
DONN France S.A. Z.I. Nord
Rue des Livraindieres
28100 Dreux
France

Germany, Austria, Belgium, Greece, Luxembourg, The Netherlands, Switzerland
DONN Products GmbH
Postfach 110245, Metallstrasse 1
4060 Viersen II
Mackenstein, Germany

Italy
DONN Italia S.P.R.L.
Via Dante 144
20090 Limito-Tioltello
Milan, Italy

Latin America/Caribbean
USG Interiors International, Inc.
8511 N.W. 61st Street
Miami, FL 33166

Mexico
YESO Panamericano S.A. de C.V.
Providencia 334, 7th Floor
Col. del Valle
03100 Mexico, D.F.
Mexico

Middle East/Africa
USG Interiors International, Inc.
125 South Franklin Street
P.O. Box 4470
Chicago, IL 60680-4470

New Zealand
USG Interiors Pacific Ltd.
P.O. Box 11-155
6 Monier Place, Mt. Wellington
Ellerslie
Auckland, New Zealand

Southeast Asia
USG Interiors Far East SDN BHD
43 & 45, 2nd Floor
Jalan SS 15/4
Subang Jaya
47500 Petaling Jaya
Selangor, Malaysia

Spain
DONN Iberica
La Granja 60
28100 Alcobendas
Madrid, Spain

Sweden, Norway, Denmark, Finland, Iceland, Russia
DONN Scandinavia
Box 7123
S-191 07 Sollentuna
Sweden

United Kingdom/Ireland
DONN Products U.K. Ltd.
1 Swan Road
South West Industrial Estate
Peterlee
Co. Durham SR8 2JJ England

United States
USG Interiors International, Inc.
125 South Franklin Street
Chicago, IL 60606-4678
United States

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USG Interiors, Inc.

125 South Franklin Street
P.O. Box 4470
Chicago, Illinois 60680-4470

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Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

Metric Specifications: USG Corporation, through its operating subsidiaries, will provide metric conversions on its products and systems to help specifiers match metric design sizes. In addition, some products are available in metric dimensions from selected manufacturing plants. Refer to

SA-100 Construction Selector for additional information and a Table of Metric Equivalents.

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Gypsum Products, Accessories & Systems



USG

There is only one SHEETROCK—the brand of gypsum panels for interior walls and ceilings developed and constantly improved by United States Gypsum Company. A SHEETROCK brand Gypsum Panel is composed of a fire-resistant gypsum core encased in a recycled heavy natural-finish paper on the face side and a strong recycled liner paper on the back side. The face paper is folded around the long edges to reinforce and protect the core, and the ends are square-cut and finished smooth.

NOTICE: Steel studs, runners and accessories in this catalog are marketed by United States Gypsum Company as integral components of its gypsum board systems. Upon request, United States Gypsum Company will provide certification that these products conform to the applicable Company and ASTM standards as well as meet the performance values identified herein. Refer to framing manufacturer's technical information for specific data on steel framing components.

The material contained in this catalog concerning steel framing systems including, but not limited to test data, technical data, details, specifications and Good Design Practices, portray construction methods in use at time this catalog went to press. They are not intended to replace or supersede specific specifications and construction documents for a given building.

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On the cover:
USG Building, Chicago, Illinois
Architect:
Skidmore, Owings & Merrill



SHEETROCK brand Gypsum Panels

Features

Dry Construction—factory-produced gypsum panels eliminate excessive moisture in construction.

Speed—panels are easily cut and quickly applied.

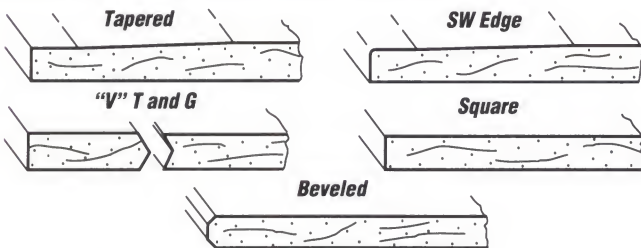
Quick Decoration—permit painting or other decoration, and the installation of metal or wood trim, almost immediately.

Fire Protection—the gypsum core will not support combustion or transmit temperatures greatly in excess of 212°F until completely calcined—a slow process.

Crack Resistance—with joints reinforced with a United States Gypsum Company joint finish system, panels form walls and ceilings highly resistant to cracks caused by frame movement, vibration or minor settling.

Non-Warping—expansion or contraction under normal atmospheric changes is negligible.

Availability—over 20 strategically located operating plants produce and/or stock the gypsum panel materials described here. Special distribution centers, in addition to these plants, increase total service efficiency to major markets and rural areas from coast to coast. All standard or specialty gypsum panel products may be considered readily available and easily procured upon short notice.



Types of Gypsum Panels

SHEETROCK brand Gypsum Panels, made in $\frac{5}{8}$ ", $\frac{1}{2}$ ", $\frac{3}{8}$ " and $\frac{1}{4}$ " thicknesses, have long edges tapered on the face side to form a shallow channel for joint reinforcement. Width: 4'; length: 8', 9', 10', 12' or 14' (except $\frac{1}{4}$ ", available in 8' and 10' lengths only); edges: tapered; finish: natural-finish face paper, suitable for paint or other decoration.

SHEETROCK brand Gypsum Panels, ULTRACODE Core, made $\frac{3}{8}$ " thick, provide 1-, 2-, 3-, and 4-hr. fire ratings with fewer layers of gypsum panels than are usually required when used in approved designs. Because fewer layers are needed, ULTRACODE Core panels provide reduced labor costs and reduced material costs. Width: 4'; lengths: 8', 9', 10' or 12'; edge: tapered; finish: natural-face paper, suitable for paint, or other decoration. Refer to page 18 for complete information on approved fire-rated systems.

SHEETROCK brand Gypsum Panels, SW Edge, made in $\frac{1}{2}$ ", $\frac{3}{8}$ " and $\frac{5}{8}$ " thicknesses, have an exclusive tapered rounded edge to help minimize ridging or beading and help compensate for extremes of temperature and humidity during construction. The SW system produces a stronger joint than with regular gypsum panels. Except for the tapered rounded edge, SW panels are identical to regular tapered edge gypsum panels.

SHEETROCK brand Gypsum Panels, FIRECODE and FIRECODE C Cores, comply with ASTM C36 for a Type X gypsum board and meet the definition of a Type X gypsum board for fire-rated assemblies in the Gypsum Association Fire Resistance Design Manual. Width: 4'; length: 8', 9', 10', 12' or 14' edges: tapered; finish: natural-finish face paper, suitable for paint, wallpaper or other decoration.

SHEETROCK brand Gypsum Panels, FIRECODE Core, made $\frac{5}{8}$ " thick, combine all the advantages of regular panels with additional resistance to fire exposure.

SHEETROCK brand Gypsum Panels, FIRECODE C Core, made in $\frac{5}{8}$ " and $\frac{1}{2}$ " thicknesses, provide improved fire protection over FIRECODE panels as a result of a specially formulated core. Systems using these panels have qualified for fire ratings up to 4 hours in walls, 3 hours in ceilings, 4 hours for column protection.

SHEETROCK brand Gypsum Panels, Foil-Back, made in $\frac{3}{8}$ ", $\frac{1}{2}$ " and $\frac{5}{8}$ " thicknesses, are available in regular, FIRECODE and FIRECODE C cores, with tapered or SW tapered edges, as indicated above. Effective as a vapor retarder. In tests per ASTM E96 (desiccant method), $\frac{1}{2}$ " foil-back panels showed a vapor permeance of 0.06 perm. Sizes, edges and finish are same as for base panels.

Foil-Back Panel Limitations: Not recommended as a base for ceramic or other tile or as base layer for TEXTONE Vinyl-Faced Gypsum Panels or other highly water vapor-resistant wall coverings. Also not to be used in hot, humid climates such as the Southern Atlantic and Gulf Coast areas.

SHEETROCK brand Gypsum Panels, Water-Resistant, made in $\frac{1}{2}$ " and $\frac{3}{8}$ " thicknesses, are a proven water-resistant base for ceramic and plastic tile and plastic-faced wall panels. Made water-resistant throughout. Available with shallow tapered edges in regular water-resistant gypsum panels, FIRECODE core and FIRECODE C core. Comply with ASTM C630. Width: 4'; length: 8', 10' or 12'; edges: tapered; finish: green treated paper, suitable for receiving tile, paint or wallpaper.

Water-Resistant Panel Limitations: Not recommended for ceilings with framing spacing greater than 12" o.c., for single-layer resilient attachment where tile is to be applied or in remodeling unless applied directly to studs. Should not be installed over a vapor retarder nor on a wall acting as a vapor retarder unless it will not be tiled or finished with an impervious paint. Not intended for use in areas subject to constant moisture such as gang showers and commercial food processing; DUROCK Cement Boards are recommended for these uses.

TEXTONE Vinyl-Faced Gypsum Panels are conventional gypsum panels with factory-applied vinyl facings in a wide range of coordinated decorator colors. The panels are used for predecorated permanent partitions, relocatable partitions or in remodeling. Not recommended as a finish layer over foil-back gypsum panels or on exterior walls in hot and humid climates unless suitable vapor control is provided by mechanical engineer.

SHEETROCK brand Gypsum Liner Panels have a special gypsum core for added fire resistance and multi-layered green paper facings that are treated to resist moisture penetration. Used in USG Shaft Wall Partitions, USG Area Separation Walls and high-performance, sound control wall systems. Panels have beveled edges, are 1" thick, 24" wide, and in lengths up to 16' (14' in some markets).

SHEETROCK brand Gypsum Coreboard has a 1" thick gypsum core encased in strong, gray paper on both sides. It is used in laminated gypsum partitions with additional layers of gypsum panels applied to the coreboard to complete the wall assembly. Manufactured with "V" T&G edges for use in solid partitions or with square edges and prescored 6" to 8" o.c. Coreboard strips are then easily snapped and separated from this master unit. Thickness: 1"; width: 24"; edges: "V" T&G or square; length: 8', 9', 10' and 12' (prescored—7' 8" lengths only); finish: gray paper, unsuitable as exposed surface. (Special order availability prevails in some markets.) Meets ASTM C442.

SHEETROCK brand Interior Gypsum Ceiling Board, a ½" thick panel, supports water-based spray texture paints and insulation like ¾" thick board but with in-place construction costs that are less. Special gypsum core contains additives which increase sag-resistance. Lightweight for easy handling. Surface burning characteristics: flame spread 15, smoke developed 0. Performance recognized by model building codes per NER 458 code compliance document. Thickness: ½"; width: 4'; lengths: 8' and 12'; edges: tapered. Meets ASTM C36.

SHEETROCK brand Exterior Gypsum Ceiling Board is a weather- and sag-resistant board designed for the soffit side of eaves, canopies and carports and other commercial and residential exterior applications with indirect weather exposure. It has a noncombustible core, is simply scored and snapped for quick application, and offers excellent paintability. Surface burning characteristics: flame spread 20, smoke developed 0. Meets ASTM C931. Has beige, water-repellent face paper. Thickness: ½"; width: 4'; lengths: 8' and 12'; edges: SW tapered. Also available ¾" thick with FIRECODE core which is suitable for fire-rated assemblies.

SHEETROCK brand Gypsum Sheathing is a fire-resistant gypsum board, ½" thick, with water-resistant gypsum core encased in specially formulated black water-repellent paper on both sides and

long edges. Meets ASTM C79. Available 24" wide, 8' length with V-shaped T&G long edges and 48" wide, 8' and 9' lengths with square edges. Available on special order: ¾" thick board and ¾" FIRECODE core sheathing board in lengths up to 12'.

GYP-LAP Gypsum Sheathing is a weather- and fire-resistant board used in exterior curtain walls and in frame construction. Lightweight board has noncombustible gypsum core clad in water-repellent paper on face and back surfaces. Meets ASTM C79. Available in western U.S., ½" thick, 24" wide, 8' length with V-shaped T&G long edges and 48" wide, 8' length with square edges. Available on special order: ¾" thick FIRECODE core sheathing.

Technical Data

SHEETROCK brand Gypsum Panels comply with ASTM C36. Thermal coefficient of expansion (unrestrained): 9.0×10^{-6} in. per in. per deg. F (40° - 100°F); hygrometric coefficient of expansion (unrestrained): 7.2×10^{-6} in. per in. per % r.h. (5% - 90% r.h.). Surface burning characteristics: flame spread 15, smoke developed 0. (For water-resistant panel: flame spread 20, smoke developed 0.)

Gypsum Panel Usage

(Type)	Regular		Regular and SW	FIRECODE	FIRECODE C		Foil-Back ⁽⁴⁾		TEXTONE	Water-Resistant ⁽¹⁾
(Thickness)	¼"	½"	½" & ¾"	¾"	½"	¾"	¾"	½" & ¾"	½" & ¾"	½" & ¾"
Walls										
Interior Walls—Single Layer										
over existing walls	X	X							X	
masonry (furred)			X	X	X	X			X	
wood framing			X	X	X	X			X	X
steel framing			X	X	X	X			X	X
masonry & concrete (direct)			X						X	X
Interior Walls—Double Layer										
masonry (furred)										
base			X	X	X	X				
finish			X	X	X	X		X		X
wood framing										
base	X	X	X	X	X	X			X	
finish		X	X	X	X	X			X	X
steel framing										
base	X		X	X	X	X			X	
finish			X	X	X	X			X	X
Exterior Walls—Single Layer										
masonry (furred)			X	X	X	X		X	X ⁽⁴⁾	X
wood framing			X	X	X	X		X	X ⁽⁴⁾	X
rigid insulation board			X							X
Exterior Walls—Double Layer										
masonry (furred)										
base			X	X	X	X	X ⁽²⁾	X ⁽²⁾		
finish	X	X	X	X	X	X			X ^{(3) (4)}	
wood framing										
base			X	X	X	X	X ⁽²⁾	X ⁽²⁾		
finish	X	X	X	X	X	X			X ^{(3) (4)}	
Ceilings										
Ceilings—Single Layer										
over existing ceiling	X	X								
wood framing		X	X	X	X	X	X	X		
steel framing		X	X	X	X	X		X		
Ceilings—Double Layer										
wood framing										
base		X	X	X	X	X	X	X		
finish		X	X	X	X	X				
steel framing										
base			X	X	X	X		X		
finish			X	X	X	X				
Ceilings—Acoustical Base										
over suspended metal grille			X	X	X	X				
over channel			X	X	X	X				

(1) Recommended as a base for ceramic or other tile. (2) Not recommended as a base for ceramic tile or as a base layer for TEXTONE Vinyl-Faced Gypsum Panels in double-layer systems.

(3) Not recommended over a vapor retarder. (4) Not recommended in hot-humid climates.

Gypsum Panel Limitations

- 1 Exposure to excessive or continuous moisture and extreme temperatures should be avoided. Gypsum board is not recommended in solar heating systems where board will be in contact with surfaces exceeding 125°F (52°C).
- 2 Must be adequately protected against wetting when used as a base for ceramic wall tile (see foil-back panel limitation). Use SHEETROCK brand Gypsum Panels, Water-Resistant, for this purpose.
- 3 Maximum spacing of framing members: $\frac{1}{2}$ " and $\frac{3}{8}$ " gypsum panels are designed for use on framing centers up to 24"; $\frac{1}{4}$ " and $\frac{3}{16}$ " panels on centers up to 16". In both walls and ceilings when $\frac{1}{2}$ " or $\frac{3}{8}$ " gypsum panels are applied across framing on 24" centers and joints reinforced, blocking is not required. Neither $\frac{3}{8}$ " nor $\frac{1}{4}$ " SHEETROCK brand Gypsum Panel is recommended for use on steel framing nor as base for water-based texturing materials. When a water-based texture is used on ceilings with framing 24" o.c.; $\frac{3}{8}$ " gypsum panels, $\frac{1}{2}$ " FIRECODE C core panels, or $\frac{1}{2}$ " SHEETROCK brand Interior Gypsum Ceiling Board should be used to prevent sag.
- 4 Application of SHEETROCK brand Gypsum Panels over $\frac{3}{4}$ " wood furring applied across framing is not recommended since the relative flexibility of the furring under impact of the hammer tends to loosen nails already driven. Furring should be nom. 2"x2" minimum (may be nom. 1"x4" if panels are to be screw-attached).
- 5 The application of gypsum panels over an insulating blanket that has first been installed continuously across the face of the framing members is not recommended. Blankets should be recessed and the blanket flanges attached to sides of studs or joists.
- 6 To prevent objectionable sag in new gypsum panel ceilings, the weight of overlaid unsupported insulation should not exceed 1.3 psf for $\frac{1}{2}$ " thick panels with frame spacing 24" o.c.; 2.2 psf for $\frac{1}{2}$ " panels on 16" o.c. framing (or $\frac{1}{2}$ " SHEETROCK brand Interior Gypsum Ceiling Board on 24" o.c. framing) and $\frac{3}{8}$ " panels 24" o.c.; $\frac{3}{8}$ " thick panels must not be overlaid with unsupported insulation. A vapor retarder should be installed in exterior ceilings, and the plenum or attic space should be properly vented.

During periods of cold or damp weather when a polyethylene vapor retarder is installed on ceilings behind the gypsum board, it is important to install the ceiling insulation before or immediately after installing the ceiling board. Failure to follow this procedure may result in moisture condensation on the back side of the gypsum board, causing the board to sag.

Water-based textures, interior finishing materials and high ambient humidity conditions can produce sag in gypsum ceiling panels if adequate vapor and moisture control is not provided. The following precautions must be observed to minimize sagging of ceiling panels:

- a) Where vapor retarder is required in cold weather conditions, the temperature of the gypsum ceiling panels and vapor retarder must remain above the interior air dew point temperature during and after the installation of panels and finishing materials.
- b) The interior space must be adequately ventilated and air circulation must be provided to remove water vapor from the structure.

Most sag problems are caused by the condensation of water within the gypsum panel. The placement of vapor retarders, insulation levels and ventilation requirements will vary by location and climate and should be reviewed by a qualified engineer if in question.

- 7 To produce final intended results, certain recommendations regarding surface preparation, painting products and systems must be adhered to for satisfactory performance.

- 8 Precaution should be taken against creating a double vapor retarder by using gypsum panels as a base for highly water vapor-resistant coverings when the wall already contains a vapor retarder. Moreover, do not create a vapor retarder by such wall coverings on the interior side of exterior walls of air-conditioned buildings in hot-humid climates where conditions dictate a vapor retarder location near the exterior side of the wall. Such conditions require assessment by a qualified mechanical engineer.

Vinyl-Faced Gypsum Panel Limitations

- 1 Adhesives for attaching vinyl-faced gypsum panels to studs must be marked suitable for application with vinyl faced gypsum panels. Compliance with ASTM C557 does not assure that the adhesive was tested for compatibility with vinyl-faced gypsum panels.
- 2 In order to avoid yellow staining and show-through of the stud adhesive onto the surfaces of the gypsum panels, and delamination of the vinyl on vinyl-faced gypsum panels caused by the adhesive, solvent-based adhesives should not contain acetone, heptane, hexane, toluene or xylene.
- 3 If TEXTONE Vinyl-Faced Gypsum Panels, FIRECODE Core, are used in a fire-rated assembly instead of a non-vinyl-faced product such as SHEETROCK brand Gypsum Panels, FIRECODE Core, the applicable fire test must permit exposed joints or battens.
- 4 Not recommended for use over foil-back panels or other vapor retarder in exterior walls.
- 5 Avoid exposure to excessive or continuous moisture and extreme temperatures.
- 6 Do not apply on exterior walls in hot, humid climates without suitable vapor control or dry air circulation behind the panels.

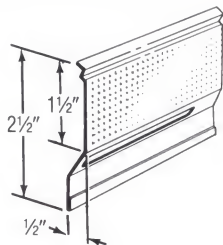
Paper-Faced Sheathing Limitations

- 1 Sheathing may be stored outside for up to one month, but must be stored off the ground and have protective covering.
- 2 Maximum stud spacing is 24" o.c.
- 3 When applied to a structure, sheathing must not be left exposed to the elements for more than one month unless the procedure as outlined in Limitation 6 is followed.
- 4 Exterior finish systems must be properly caulked for the life of the job, particularly around all cuts.
- 5 Exterior finish systems applied over gypsum paper-faced sheathing must be applied with adhesive and mechanical fasteners through the sheathing into the wall framing. Alternate methods of application are not endorsed and their performance and that of the substrate are solely the responsibility of the specifier. Direct application of paint, texture finishes and coatings over gypsum sheathing is not recommended.
- 6 For in-place exposure up to six months, all gaps resulting from cuts, corners, joints and machine end cuts of the sheathing should be filled with exterior caulk at time of erection.
- 7 For curtain wall construction, cover gypsum paper-faced sheathing with No. 15 asphalt felt within 30 days of sheathing erection. Felt should be applied horizontally with 2" overlap and immediately anchored with metal lath, masonry ties or corrosion-resistant screws or staples.
- 8 Sheathing for exterior ceilings and soffits is not recommended, unless covered with metal lath and exterior stucco.

Furring Accessories

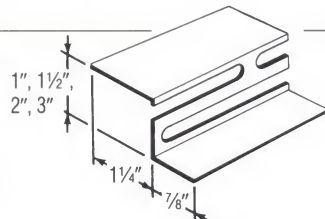
RC-1 Resilient Channel

Part of the family of SHEETROCK Metal Products. Corrosion-resistant steel channel for resilient attachment of gypsum panels to wood and steel framing. Reduces sound transmission through wood and steel framed partition and floor-ceiling assemblies. Width: 2½"; depth: ½"; length: 12'. Limitation: not for use beneath highly flexible floor joists; should be attached to walls or ceilings with 1½" coarse thread or drywall steel screws; not suitable for use with more than 2 layers ½" thick gypsum panels.



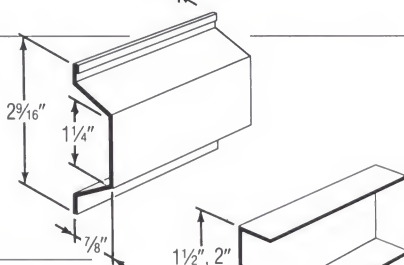
SHEETROCK Z-Furring Channels

Mechanically attach THERMAFIBER, mineral and rigid foam insulations and SHEETROCK brand Gypsum Panels to interior surfaces of monolithic concrete and masonry walls. Also for attaching insulation and gypsum panels to interiors of existing walls and ceilings. Made of corrosion-resistant steel; furring depths: 1", 1½", 2", 3"; length: 8'6".



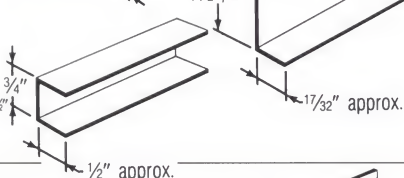
Metal Furring Channels

Hat-shaped channels for ceiling and wall furring. Roll-formed from two gauges of corrosion-resistant steel. DW-25 for screw attachment of ½" and ¾" gypsum panels. DW-20 for greater spans and load-carrying capacity in ceiling applications. Products comply with ASTM C645. Face width: 1½"; depth: ¾"; length: 12'.



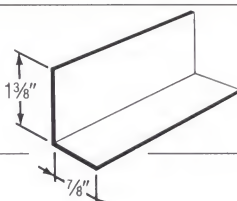
Cold-Rolled Channels

Made of 16-ga. steel, used for furring and in suspended ceilings and partitions. Available either galvanized or black asphaltum painted. Sizes: ¾", with ½" flange; 1½" and 2" with ½" flange. Length: 16' and 20'.



Metal Angles

1½" x ¾" corrosion-resistant steel angle sections used as runners to secure and brace 1" coreboard in laminated gypsum partitions. 2½" x 2½" size made for High Attenuation Double Wall Systems. Length: 10'.



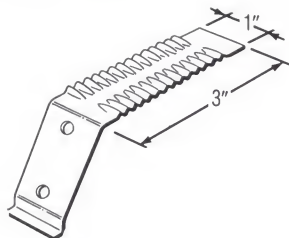
Metal Furring Channel Clips

Made of galvanized wire for attaching DW-25 Metal Furring Channels to 1½" cold-rolled channels. Installed on alternate sides of carrying channels; where clips cannot be alternated, wire tying recommended.



Adjustable Wall Furring Brackets

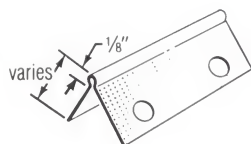
Used in braced furring systems for exterior masonry walls. 20-ga. corrosion-resistant steel with corrugated edges. Screw-attached to steel studs. Fur out panels up to 2½" plus stud width.



Trim Accessories

DUR-A-BEAD Corner Bead

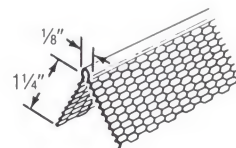
Part of the family of SHEETROCK Metal Products. All-metal galvanized steel reinforcement, protects external corners. Concealed with United States Gypsum Company joint compounds for a smooth, finished corner. Provides superior joint compound adhesion. Available in two flange widths: No. 103 1½"x1½" and No. 104 1¼"x1¼".



SHEETROCK Expanded Flange

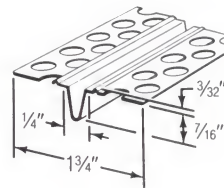
Corner Bead

Galvanized steel external corner reinforcement with ¼" grounds (No. 800) and ½" grounds (No. 900). Both have 1¼" wide fine-mesh expanded flanges. Nailed to framing through panels or stapled to panels. Provides superior key for joint compounds and eliminates shadowing and edge cracking.



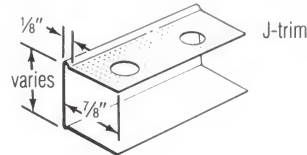
SHEETROCK Zinc Control Joint No. 093

Relieves stresses of expansion and contraction across the joint in large ceiling and wall areas. Made from roll-formed zinc with a tape-protected ¼" opening ¼" deep. Length: 10'. Limitation: where sound and/or fire ratings are prime considerations, an adequate seal must be provided behind the control joint.



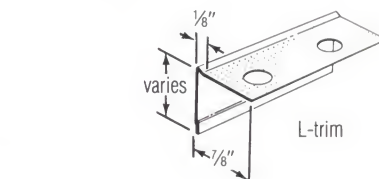
SHEETROCK Metal Trims

Provide protection and neat finished edges to gypsum panels at window and door jambs, ceiling angles and intersections where panels abut other materials. Nailed through the channel and panels into the framing or jamb. Eliminate precision cutting and mitering. Finished with joint compounds (except 400). Made in following types:



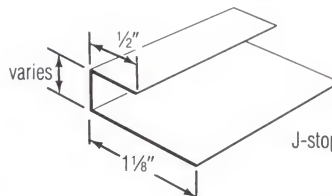
SHEETROCK L-Trim & J-Trim

Steel casing, includes No. 200-A J-shaped channel in ½" and ¾" sizes; No. 200-B L-shaped angle edge trim without back flange to simplify application, in ½" and ¾" sizes.



SHEETROCK J-Stop

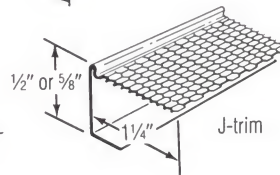
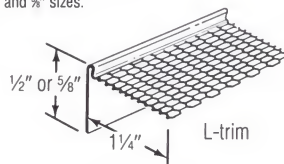
Reveal type trim, requires no finishing compound, includes No. 400 in ¾" size, No. 401 in ½", No. 402 in ¾" size.



SHEETROCK Expanded Flange

L-Trim & J-Trim

Expanded-flange trim used to provide edge protection at cased openings and ceilings or wall intersections. Includes 801-A J-shaped and 801-B L-shaped trim, both in ½" and ¾" sizes.

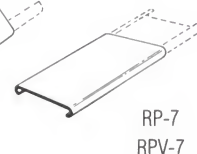
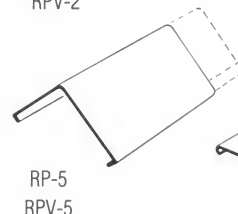
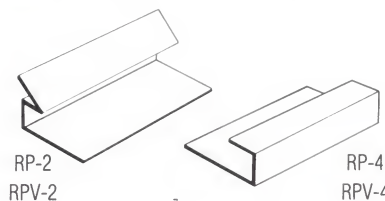


Plastic Trim Mouldings

TEXTONE Rigid Vinyl Trim

(RP Series)

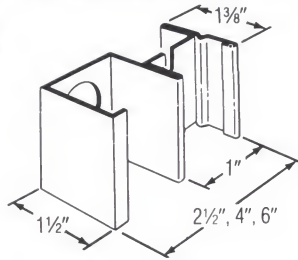
Vinyl plastic in Almond and Ash Blue. Available for ½" and ¾" thick panels; lengths: 8', 9', 10'; shapes RP-2 Inside Corner, RP-4 End Cap, RP-5 Snap-on Corner, RP-7 Snap-on Batten, RP-46 Ceiling Drive-in Trim. RPV series trims also available factory-laminated to match TEXTONE Vinyl-Faced Gypsum panels.



USG Cavity Shaft Wall and Area Separation Wall Components

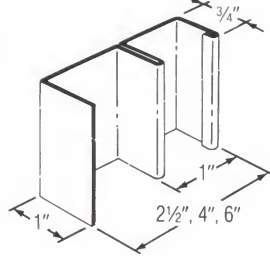
USG Steel C-H Studs

Rigid, roll-formed sections for cavity shaft walls shaped to engage 1" liner panels. Widths: 2½" and 4"; styles: 212CH25, 212CH22, 212CH20, 400CH25, 400CH22, 600CH20; lengths as required.



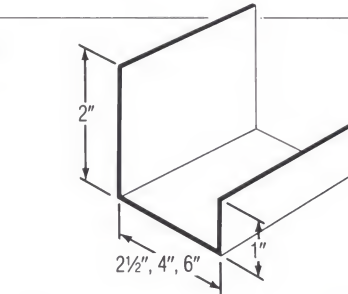
USG Steel E-Studs

Used singly for cavity shaft walls to cap partition or both sides of closure panel; widths: 2½", 4" and 6"; styles: 212ES25, 212ES20, 400ES25, 400ES20, 600ES25, 600ES20; lengths as required.



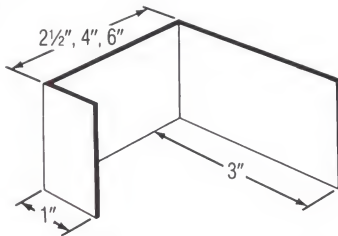
USG Steel J-Runners

Used at floor and ceiling in shaft wall assemblies and for special stud framing, made with unequal legs in 2½", 4" and 6" widths; styles: 212JR24, 212JR20, 400JR24, 400JR20, 600JR24, 600JR20; length: 10'.



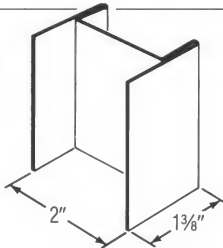
USG Steel Jamb Struts

Used in jamb framing for fire-rated shaft wall elevator door frames. Widths: 2½", 4" and 6"; style: 212JS20, 400JS20, 600JS20, length: 10'.



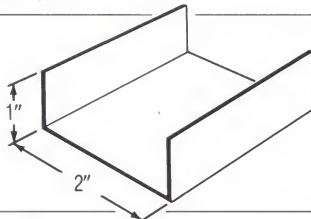
USG Steel H-Studs

Slide over and engage edges of adjacent liner panels for solid area separation walls. Width: 2"; style: 200HS25; length: 8' to 16'.



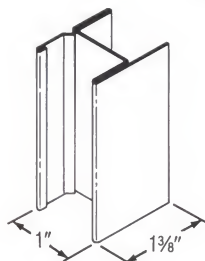
USG Steel CR-Runners

For solid area separation walls: 2" width, style 200CR25, 10' length.



USG H-Spline

Roll-formed from 20-ga. steel for high-performance drywall partition systems. Slides over and engages edges of adjacent 1" gypsum liner panels. Width: 1"; length: 8' to 12'.



Screws

Fastening Application

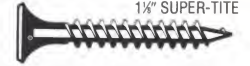
Fastener Used

Gypsum Panels to Steel Framing⁽¹⁾

Attaches ½" and ¾" single layer panels to steel studs, runners, channels.



Attaches ¾" gypsum panels to resilient channels or other steel framing.



Attaches 1" coreboard to steel runners and metal angle runners in solid partitions. Resilient channels to wood framing.



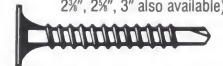
Attaches ½" and ¾" double layer panels to steel studs, runners, channels.



Gypsum Panels to Steel Framing (20 gauge and heavier)

½" and ¾" panels and gypsum sheathing to steel studs and runners up to 14 gauge. Specify corrosion-resistant screws to attach gypsum sheathing in curtain walls. Use 1½" and longer for multilayer gypsum board applications.

1" SUPER-TITE DRILLERS (1½", 1", 1", 1", 1", 2½", 3" also available)



(BUILDEX Type S-12, Bugle Head, available in 1", 1½", 1", 1", 2", 2½", 3")

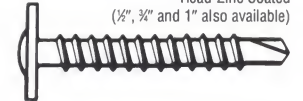
Self-furring metal lath and brick wall ties through gypsum sheathing to steel studs and runners in curtain walls. Specify corrosion-resistant for exterior applications.

1½" BUILDEX Type S-12, Pancake Head



Metal lath to steel framing up to 14 gauge.

1½" SUPER-TITE Modified Truss Head-Zinc Coated (½", ¾" and 1" also available)



Steel Studs to Door Frames, Runners

Steel studs to runners and resilient channels to 25-ga. steel studs.

¾" SUPER-TITE Pan Framing-Special Framer (BUILDEX ¾" Type S pan Head available)



Steel studs to door frame jamb anchor clips. Steel studs to runners. Other metal to metal attachment up to 14 gauge.

¾" SUPER-TITE DRILLER Pan Head (½" and ¾" also available)



(BUILDEX ¾" and ½" Type S-12, Pan Head and ½" Type S-12, Low-Profile Head available for up to 12 gauge.)

Gypsum Panels to Wood Framing

¾", ½" and ¾" single layer panels to wood framing. RC-1 Resilient Channels to wood framing.

1½" SUPER-TITE Type W Coarse Thread (1", 1½", 1", 2", 2½", 2½", 3" also available)



(1½" BUILDEX Type W available)

Gypsum Panels to Gypsum Panels

Multilayer adhesively laminated gypsum to gypsum partitions (not recommended for double layer ¾" panels).

1½" SUPER-TITE Laminating



(1½" BUILDEX Type G, Bugle Head available)

(1) Includes steel studs and runners, 25 to 20-ga; metal angles; metal furring channels; resilient channels. If channel resiliency makes screw penetration difficult, use screws ½" longer than shown to attach panels to resilient channels. For 25 to 20 ga. steel framing, use SUPER-TITE or BUILDEX Type S Screws; for 20 to 12 ga. use SUPER-TITE DRILLERS or BUILDEX Type S-12 Screws. For steel applications not shown, select a screw length at least ¾" longer than total thickness of materials to be fastened.

Fastening Application

Fastener Used

Cement Board to Wood Framing

For DUROCK Cement Board and DUROCK Exterior Cement Board to wood framing. Wood trim over single-layer panels to steel studs, runners. With anti-corrosive coating.

1 1/4", 1 1/8" DUROCK Wood Screw



For DUROCK Exterior Cement Board applied over approved 1/2" rigid foam insulation to exterior wood framing. With anti-corrosive coating.



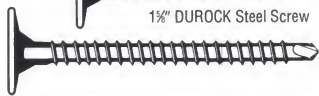
Cement Board to Steel Framing

For DUROCK Cement Board and DUROCK Exterior Cement Board to steel framing (20-12 ga.). With anti-corrosive coating.

1 1/4" DUROCK Steel Screw



For DUROCK Exterior Cement Board and DUROCK Cement Board applied over approved 1/2" rigid foam insulation to steel framing (20-12 ga.). With anti-corrosive coating.



Cement Board

DUROCK Cement Board, the multi-purpose building panel, offers architects, builders and tile contractors a smooth, sound base for glass and ceramic mosaics; ceramic and quarry tile; lugged tile; USG Exterior Textured Finish and EIFS; thin stone tile and thin brick. Suitable for application to wood or steel framing spaced 16" o.c. in new construction and in remodeling. Board is ideal for use in partitions, walls, floors, soffits and ceilings in wet or dry areas. It is highly durable in high-moisture areas found in baths, showers, kitchens and laundry rooms. Also adaptable for fences, fireplace fronts, mobile home skirting, agricultural buildings, UL-listed wall shield/floor protector, garage wainscoting and exterior chimneys.

The 1/2" thick DUROCK Boards are listed by Underwriters Laboratories, Inc., for use with UL-listed solid-fuel room heaters and fireplace stoves. Used as a wall shield, board reduces by two-thirds the manufacturer-specified clearance (minimum 12") between room heater or stove and combustible wall surface. Board may also be used as a floor protector in place of one layer of 3/8" thick millboard.

DUROCK Cement Board is formed in a continuous process of aggregated portland cement slurry and reinforced with polymer-coated, glass-fiber mesh embedded in both surfaces. Standard interior boards are produced to 1/2" thickness, cut to size and cured. Ends are square cut and edges are reinforced and formed smooth. Smooth wrapped edge is patented—No. 4,916,004.

In addition to standard 1/2" DUROCK Cement Board, DUROCK Underlayment is available for floors and counter tops. Its nominal 3/16" thickness helps eliminate transition trim when abutting carpet or wood flooring and helps minimize level variations with other finish materials. Its 48"x48" size is easy to handle and helps cut down on waste. Applies directly over old substrate on counter tops to save time. See SA-932 *DUROCK Cement Board Systems* for complete information on DUROCK Cement Board and DUROCK Underlayment.

Insulations

THERMAFIBER Mineral Wool Insulations are a man-made vitreous fiber (MMVF) product providing superior fire protection and improving sound control in partition and floor-ceiling assemblies.

Sound Attenuation Fire Blankets (SAFB) are a paperless, semi-rigid MMVF mat designed to improve STC ratings when installed in steel stud and wood stud construction. **Fire Safety FS-15 Blankets**

are used to provide noncombustible exterior wall furring and steel stud curtain wall assemblies. They are open-faced and require separate vapor retarder. For more information, see folder SA-707 *THERMAFIBER Life-Safety Fire Containment Systems* in section 07200 of Sweet's General Building and Renovation file.

Firestop

FIRECODE Compound is a compound developed for use with THERMAFIBER Safing Insulation to provide wall and floor through-penetration firestop systems that combine exceptional economy and performance. Effectively seals openings around pipe and cable poke-through openings, construction joints, blocking particulate, smoke, fire, sound, and air movement. Tested per ASTM E814 and UL1479 in tests conducted at Underwriters Laboratories. Refer to SA-727 for information on the USG Fire Stop System.

Adhesives

Drywall adhesives make an important contribution to gypsum panel attachment where the finest room interiors are desired. Their use greatly reduces the nail or screw fastening otherwise required, thus saves labor on spotting and sanding. Also minimizes nail pops and other fastener imperfections.

Recommended for laminating gypsum panels in multi-layer fire-rated or non-rated partitions and ceilings are **SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compounds**—dry powder products, applied by spreader, requiring mixing and temporary fastening in application or **SHEETROCK All Purpose or Taping Joint Compound Ready-Mixed**. These compounds provide tight bond when dry yet permit adjustment of panels after contact.

Recommended adhesives for non-fire-rated construction are a solvent-based stud adhesive which meets ASTM C557 or a rubber-based construction adhesive for subfloors and plywood construction which meets ASTM C557 and American Plywood Association Performance Standard AFG-01. Laminating and liquid contact adhesives are also commercially available. These adhesives bridge minor irregularities in the base or framing, make it easier to form true joints and level surfaces. The use of adhesive adds strength to an assembly, reduces fasteners required, helps eliminate loose panels and nail pops.

Acoustical Sealant

SHEETROCK Acoustical Sealant is a highly elastic, water-base caulking for sound-rated partition and ceiling systems and sealing exterior walls to reduce infiltration. Non-bleeding and staining, pumpable and easily applied in beads. Provides excellent adherence to most surfaces, permanent flexibility and lasting seal. Surface burning characteristics: flame spread 5, smoke developed 0. Meets ASTM C557 requirements, complies with ASTM C919.

Joint Treatments

Job Estimating

For estimating purposes: for 1,000 sq.ft. of surface area to be finished, approximately 370 lin. ft. of tape and 83 lb. of conventional drying-type powders, 67 lb. of lightweight drying-type powders, 72 lb. of conventional setting-type powders, 52 lb. of lightweight setting-type powders, 138 lb. of conventional weight ready-mixed type or 9.4 gallons of lightweight ready-mixed joint compound are required.

Products

Joint Tapes

SHEETROCK Joint Tape is a strong, cross-fibered paper tape with minimal longitudinal stretch and superior tensile strength. Lightly pre-creased for corner application.

SHEETROCK Fiberglass Drywall Tape is made with a unique cross-fiberglass construction to provide greater drywall joint strength than conventional fiberglass leno-weave mesh tapes. Self-adhesive tape goes on quickly—eliminates bedding coat and provides smooth finished joints in only two coats. For first coat over tape, setting-type joint compound is used; for second coat, setting-type or drying-type (ready-mixed or powder) joint compounds may be used. Tape is also ideal for patching small holes and cracks in drywall and plaster walls and ceilings.

Ready-Mixed Compounds

SHEETROCK Ready-Mixed Joint Compounds are non-asbestos, vinyl-based formulations specially premixed to a creamy, smooth consistency. They offer excellent slip and bond, easy workability. Joint finishing is fast, easy and smooth, reducing labor costs and improving appearance and quality of the job. Meet ASTM C475.

Limitation: protect wet joints and container from freezing.

SHEETROCK Taping Joint Compound Ready-Mixed is a high-performance product for embedding tape and is also used for laminating.

SHEETROCK Topping Joint Compound Ready-Mixed is a low-shrinkage, easily applied and sanded product recommended for second and third coats over ready-mixed taping and all purpose compounds. Also used for simple hand-applied texturing or skim coating in some markets; check suitability of formula in your area with local sales office. Not suitable for embedding tape or as first coat over metal corners, trim and fasteners.

SHEETROCK All Purpose Joint Compound Ready-Mixed used for embedding, finishing, simple hand-applied texturing, laminating and skim coating. Combines single package convenience with good taping and topping characteristics. Recommended for repairing cracks in interior plaster and masonry not subject to moisture.

SHEETROCK Lightweight All Purpose Joint Compound Ready-Mixed (PLUS 3) offers all benefits of a conventional product. Exclusive advantages: weighs up to 35% less, requires only two coats over metal bead and fasteners, gives exceptional ease of sanding. This all purpose, single package product provides tight bond, superior slip and workability, good crack resistance and low shrinkage. Also used for simple hand-applied texturing.

Vinyl-Base Powder Joint Compounds

SHEETROCK Powder Joint Compounds are top-quality, non-asbestos, conventionally drying-type products providing easy mixing, smooth application and ample working time. Designed for embedding tape, for fill coats and finishing over drywall joints, corner bead, trim and fasteners. Also used for simple texture finishes for decorating variety. Meet ASTM C475.

SHEETROCK Taping Joint Compound is designed for embedding tape and for first fill coat on metal beads, trim and fasteners; also used for patching plaster cracks. Outstanding bond and resistance to tape cracking.

SHEETROCK Topping Joint Compound is a smooth-sanding material for second and third coats over taping compound or all purpose compound. Produces excellent feathering and superior finishing results.

SHEETROCK All Purpose Joint Compound incorporates good taping and topping characteristics in a single product. For use where finest results of the specialized compounds (above) are not necessary. Also has good texturing properties.

SHEETROCK Lightweight All Purpose Joint Compound (AP LITE)

weighs 20% less than conventional compounds; offers lower shrinkage, better crack resistance, easier mixing, application and sanding.

SHEETROCK Setting-Type (DURABOND) and Lightweight Setting-Type (EASY SAND) Joint Compounds

These setting-type powder products were developed to provide faster finishing of drywall interiors, even under slow drying conditions. Rapid chemical hardening and low shrinkage permit same-day finishing and usually next-day decoration. Features exceptional bond; virtually unaffected by humidity extremes. Ideal for laminating double-layer systems, particularly fire-rated assemblies, and for adhering gypsum panels to above-grade concrete surfaces. May be used for skim coating and surface texturing and for filling, smoothing and finishing interior above-grade concrete. Also used to treat joints in exterior gypsum ceiling board and to embed tape and fill beads in veneer finish systems when any of the following conditions exist: rapid drying conditions due to low humidity, high temperature and excessive evaporation; metal framing is specified; 24" o.c. wood frame spacing and a single layer gypsum base veneer system is specified ($\frac{5}{8}$ " base with one-coat veneer finish and $\frac{1}{2}$ " or $\frac{5}{8}$ " base with two-coat veneer finish). Required as prefill material for SHEETROCK brand Gypsum Panels, SW Edge. Recommended for filling joints of SHEETROCK brand Gypsum Panels, Water-Resistant, and treating fastener heads in areas to receive ceramic or plastic tile. Also used extensively for touch-up and patching. **Limitations:** SHEETROCK Setting-Type Joint Compounds (DURABOND) are difficult to sand after drying and must be smoothed before complete setting. Not to be applied over moist surfaces or surfaces likely to become moist, on below-grade surfaces, or on surfaces subject to moisture exposure, pitting or popping.

SHEETROCK Setting-Type Joint Compound (DURABOND) In addition to the above applications, these compounds are also ideal for repairing surface damaged areas in handball and racquetball court walls finished with STRUCTO-BASE and STRUCTO-GAUGE Gypsum Plasters. Also use for repair of STRUCTOCORE Security Wall system. Offers varied setting times of 20 to 30 min., 30 to 80 min., 85-130 min., 180-240 min. and 240 to 360 min.

SHEETROCK Lightweight Setting-Type Joint Compound (EASY SAND) weighs 25% less than conventional setting-type compounds for easier handling, faster application and improved productivity on the job. Provides sanding ease similar to a ready-mixed, all purpose joint compound. Offers varied setting times of 20 to 30 min., 30 to 80 min., 85 to 130 min., 180 to 240 min. and 240 to 360 min.

Concrete Finishing Compound

COVER COAT Compound is a vinyl-base product, designed for filling and smoothing monolithic concrete ceilings and columns located above grade—no extra bonding agent needed. Supplied in ready-mixed form (sand can be added), easily applied with drywall tools in two or more coats. Dries to a fine white surface usually making further decoration unnecessary on ceilings. **Limitations:** not to be applied over moist surfaces or surfaces likely to become moist (by condensation or otherwise); on ceiling areas below grade; on surfaces which project outside the building, or on other areas which might be subject to moisture, freezing, efflorescence, pitting or popping.

Texture Finishes

USG Acoustical Finish—an exclusive spray plaster texture finish for gypsum panels, interior concrete and basecoat plaster ceilings. Asbestos-free. Provides a natural-white, evenly textured, sound-rated finish. For use on non-contact surfaces only in new construction and renovation. Surface burning characteristics: flame spread 10, smoke developed 25. Sound rated: NRC 0.50 for gypsum panels, 0.55 for concrete, 0.55 for conventional plaster at $\frac{1}{2}$ " finish thickness; 0.75 for concrete and conventional plaster at a 1" finish thickness.



USG Acoustical Finish for a sound-rated, textured surface.

SHEETROCK First Coat—a flat latex basecoat paint formulated to provide a superior first (prime) coat over interior gypsum board and concrete surfaces. Equalizes differences between the porosity and texture variations of gypsum board face paper and finished joint compound to minimize decorating problems such as "joint banding." Applies with brush, roller or spray equipment. Dries to a white finish in less than 30 minutes; topcoat within an hour. Not intended as a final coating—should be overpainted when dry. Available ready-mixed or in powder form—mixed with water at jobsite. Covers approximately 300 to 500 sq. ft. per gallon.

IMPERIAL QT Spray Texture Finish—aggregated non-asbestos powder, produces acoustical finish appearance on ceilings; provides no acoustical correction. Excellent bonding qualities; helps conceal

surface defects. Formulated with polystyrene aggregates for spray application in super-coarse, coarse, medium or fine textures. White only. Surface burning characteristics: flame spread 5, smoke developed 0 for polystyrene-aggregated formulation applied over SHEETROCK brand Gypsum Panels. Limitation: not recommended for use where constant humid conditions exist.

USG Latex Additive—latex emulsion for use with IMPERIAL QT Spray Texture Finish. Provides increased bond and surface hardness when added to wet-mix at a rate of 1 to 2 pints per bag of Finish.

USG Spray Texture Finish—a top performance, non-asbestos powder product, available aggregated or unaggregated. Fast drying; offers good concealment and superior coverage. Produces light spatter, spatter/knockdown and orange peel finishes with machine spray. Highly effective on sidewalls and ceilings. Tinting not recommended; readily overcoated with most wall paints. Not washable unpainted.

SHEETROCK Wall and Ceiling Spray Texture (TUF TEX)—unaggregated texture coating designed for application over properly prepared interior surfaces. Produces a variety of texture patterns from bold spatter/knockdown to light orange peel. Dries to a hard, white finish. Helps conceal minor substrate defects. Not intended as a final coating—should be overpainted when dry. Not washable unpainted.

USG Multi-Purpose Texture Finish—an economical, unaggregated, non-asbestos powder product for producing light to medium-light textures on drywall or other interior surfaces. Textured effect obtained by brush, roller or spray application. Helps conceal minor surface defects. Dries to a soft-tone white finish. Should be overpainted on walls, may be left unpainted on ceilings when an adequate amount of material is applied to provide sufficient hiding properties. Not washable unpainted.

USG QUIK & EASY Ready-to-Use Wall and Ceiling Texture—white, non-asbestos, latex-type material for interior surfaces, offers extra-thickness with the speed of a ready-mixed formulation and a one-coat application. Develops a durable surface with minimal to no fissuring. Excellent hiding over gypsum panels, concrete, primed plaster, masonry and non-staining wood surfaces. Can be job-mixed with a variety of aggregates for greater coverage and applied with brush, roller, spray or trowel for a range of texture effects. Not washable unpainted; overpaint for protection against soiling.

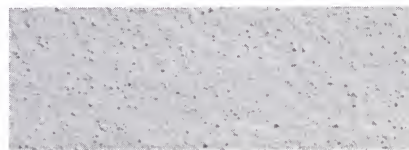
USG Texture XII Drywall Surfer—a non-asbestos powder product, mixed with water, for fast, low-cost spray application to interior gypsum drywall surfaces. Available aggregated for sand finish. Combines easy mixing, fast drying, excellent coverage and good concealment. An ideal base for wall paints; may be left unpainted on ceilings when an adequate amount of material is applied to provide sufficient hiding properties. Not washable unpainted.



*IMPERIAL QT Spray Texture Finish
Medium Finish*



*USG QUIK & EASY Texture
Extra Thick Finish*



*USG Texture XII Drywall Surfer
Sand-Effect Finish*



*USG Multi-Purpose Texture
Light-Stipple Finish*



*USG Spray Texture
Spatter/Knockdown Finish*



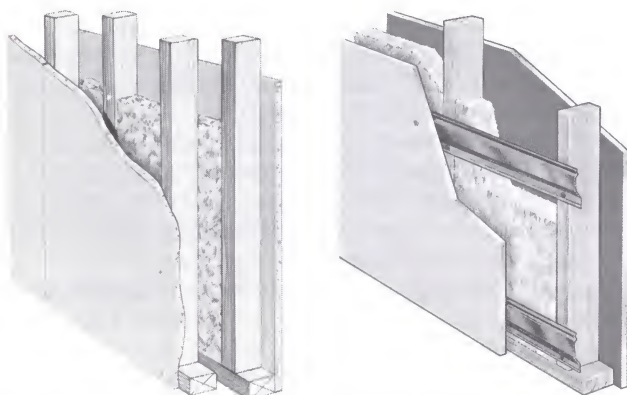
USG Acoustical Finish

Wood Framed Gypsum Board Systems

Wood-framed gypsum drywall assemblies offer economical, quickly erected, load-bearing partitions, walls and ceilings wherever fire protection is desired with wood framing. Excellent sound attenuation at low cost is provided when gypsum panels are resiliently attached. The assemblies are likewise suitable for wall furring and exterior soffit applications.

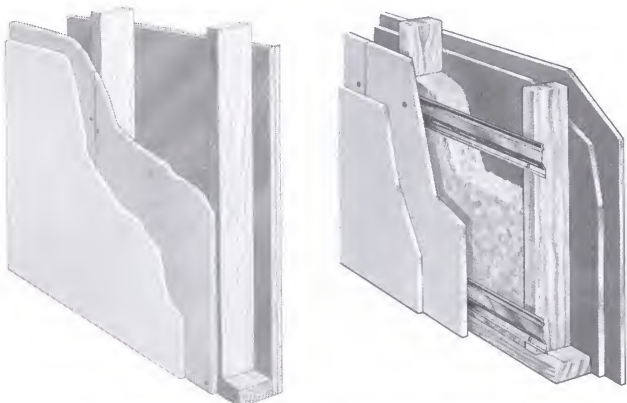
Partitions

Single Layer—a basic drywall load-bearing system suitable where SHEETROCK brand Gypsum Panels are applied direct to wood framing—either vertically with long edges parallel to framing, or horizontally with long edges at right angles to framing members. Perpendicular application, recommended except in certain fire-rated partition construction, provides greater strength, reduces joint treatment and blocking needed, compensates for uneven framing alignment. Fastening of panels is by single or double nailing, screw or adhesive application.



Single-layer staggered stud partition Single-layer resilient partition

Double Layer—systems have a face layer of SHEETROCK brand Gypsum Panels job-laminated to a base layer of gypsum panels and/or nailed or screw-attached through base layers directly to wood framing in walls and ceilings. Because laminated systems minimize the use of mechanical fasteners in the face layer, finer appearance results along with greater strength, fire and sound resistance. Adhesive lamination of face layer to base layer, when both are gypsum panels, is by either of two methods: (a) strip lamination—a SHEETROCK Setting-Type Joint Compound or SHEETROCK Taping or All Purpose Joint Compound Ready-Mixed applied in vertical strips 24" o.c. and supplementary 1½" Type G screws, or (b) sheet lamination—adhesive applied over the entire panel surface with supplementary Type G screws or temporary supports until adhesive dries.



Double-layer partition Double-layer resilient partition

Renovation—½" SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw-attached to SHEETROCK Z-Furring Channels with THERMAFIBER SAFB between channels, improve the sound control of wood stud plaster walls. With 3" channels and 2" blankets, the assembly provides 50 STC sound rating.

Gypsum panels for these assemblies are available in five thicknesses and nine types. SHEETROCK brand Gypsum Panels, FIRECODE and FIRECODE C Cores, obtain higher fire-resistance ratings than regular panels. SHEETROCK brand Gypsum Panels, Water-Resistant, are recommended as a tile base for tub and shower areas. SHEETROCK brand Exterior Gypsum Ceiling Board offers superior weather- and sag-resistance plus excellent paintability in exterior soffits.

RC-1™ Resilient Channel Partitions

SHEETROCK brand Gypsum Panels are screw-attached to resilient channels which are also screw-attached 24" o.c. to the framing. The galvanized steel channels "float" the panels away from the framing; provide a spring action that isolates the gypsum panel surface. These systems combine high effective sound isolation with lightweight low-cost construction.

An excellent value in wood frame party walls consists of single-layer ½" SHEETROCK brand Gypsum Panels, FIRECODE C Core, resiliently attached to one side of stud and directly attached to the other side, plus 3" THERMAFIBER SAFB pressed tightly into the stud cavity. This lightweight partition is widely used for its high sound value, STC 50, at costs which are little more than for conventional partition systems. (Use of a filler strip at the base may reduce STC rating.) It also offers 1-hour rated fire resistance; often chosen for use between units in garden apartments.

Where exceptional sound control, greater fire resistance and strength are required, double-layer drywall construction is used with THERMAFIBER SAFB and RC-1 Resilient Channels applied to one side of wood studs.

Exterior Wall Furring

SHEETROCK brand Gypsum Panels, Foil-Back, provide an economical, efficient vapor retarder and a readily decorated interior surface for exterior walls. Panels are attached to wood furring strips 16" o.c. or screw-attached to SHEETROCK Z-Furring Channels 24" o.c. The channels mechanically attach THERMAFIBER Fire Safety FS-15 Blankets or rigid foam insulation to the interior of exterior walls. The system provides a self-furring solid backup for foil-back panels, screw attached to the channels.

Limitations

- 1 SUPER-TITE or BUILDEX Type S Screws must be used for attachment of single-layer panels to RC-1 Resilient Channels.
- 2 Resilient channels must be attached with 1¼" SUPER-TITE or BUILDEX Type W or Type S Screws. Nails must not be used.
- 3 Resilient ceilings should not be installed beneath highly flexible floor joists. Install only to framing meeting these requirements:
 - A Framework should meet the minimum requirements of local building codes.
 - B Framing members should be straight, true, of uniform dimension, and framing should be properly aligned.
 - C All framing lumber should be of a good grade for the intended use, and 2"x4" nominal size or larger should bear the grade mark of a recognized inspection agency.
 - D All framing lumber should have a moisture content not in excess of 19% at time of gypsum panel application.
 - E Do not attach panels to extremely soft framing members.

- 4 Direct attachment to wood framing with fastener penetration into wood exceeding 1" is not recommended except where required to meet fire rating.
- 5 Maximum resilient channel spacing: ceilings—24" o.c. for joists 16" o.c.; 16" o.c. for joists 24" o.c. Sidewalls—24" o.c. Also see support spacing, Limitation 7.
- 6 SHEETROCK brand Gypsum Panels should not be exposed to excessive or continuous moisture and extreme temperature. Specially formulated SHEETROCK brand Gypsum Panels, Water-Resistant, are recommended as a base for wall tile in bathrooms and other high moisture areas, but they are not recommended for areas subject to constant moisture such as gang showers and commercial food processing. DUROCK Cement Board is recommended as a ceramic tile base under these conditions.
- 7 Maximum support (studs, joists, channels, furring) spacing for gypsum panels:

Panel Thickness ⁽¹⁾	Location	Application method ⁽²⁾	Max. support spacing o.c.	
Single-Layer Application			in	mm
3/8" (9.5 mm)	ceilings ⁽³⁾	perpendicular ⁽⁴⁾	16	406
	sidewalls	parallel or perpendicular	16	406
1/2" (12.7 mm)	ceilings	parallel ⁽⁴⁾	16	406
		perpendicular	24 ⁽⁵⁾⁽⁶⁾	610
5/8" (15.9 mm)	sidewalls	parallel or perpendicular	24	610
3/4" (19.0 mm)	ceilings ⁽⁶⁾	parallel ⁽⁴⁾	16	406
		perpendicular	24	610
	sidewalls	parallel or perpendicular	24	610
Double-Layer Application				
3/8" (9.5 mm)	ceilings ⁽⁷⁾	perpendicular	16	406
	sidewalls	perpendicular or parallel	24 ⁽⁸⁾	610
1/2" & 3/4" (12.7 & 15.9 mm)	ceilings	perpendicular	24 ⁽⁸⁾	610
	sidewalls	perpendicular or parallel	24 ⁽⁸⁾	610

(1) Panel of 3/8" thickness is recommended for the finest single-layer construction, providing increased resistance to fire and transmission of sound; 1/2" for single-layer application in new residential construction and remodeling; and 3/4" for repair and remodeling over existing surfaces.

(2) Long edge position relative to framing. (3) Not recommended below unheated spaces. (4) Not recommended if water-based texturing material is to be applied. (5) Max. spacing 16" if water-based texturing material is to be applied. (6) If 1/2" SHEETROCK brand Interior Gypsum Ceiling Board is used, max. spacing is 24" o.c. for perpendicular application with weight of unsupported insulation not exceeding 2.2 psf., when water-based texturing materials are used. (7) Adhesive must be used to laminate 3/8" board for double-layer ceilings. (8) Max. spacing 16" o.c. if fire rating required.

- 8 These assemblies are not recommended for exterior soffits and ceilings which project upward and away from the building proper.

Ceilings

Single-Layer—In single-layer ceiling assemblies, SHEETROCK brand Gypsum Panels are applied across the supports and fastened with nails or screws. Nails are spaced 6" to 7" o.c. (6" for fire-rated construction); 1 1/4" Type W screws are spaced 12" o.c. Where no fire rating is required, adhesive nail-on fastening improves bond strength and reduces face nailing.

Resilient Attachment—Resilient channel systems offer fire-resistant wood joist floor/ceiling assemblies having highly efficient sound isolation at low cost—qualities particularly needed in apartments, motels and other multi-family buildings. RC-1 Resilient Channels are screw-attached across wood joists; gypsum panels are attached to channels with Type S Screws. A one-hour fire rating is available with 1/2" SHEETROCK brand Gypsum Panels, FIRECODE C Core.

High Performance—USG High Performance Floor/Ceiling Systems achieve a 2-hour fire resistance rating (UL Design L541) and deliver STC/MTC ratings as high as 60/54, IIC ratings as high as 62. Floors consist of 1" SHEETROCK brand Gypsum Liner Panels over 1/2" plywood and are finished in one of two ways: (1) ceramic tile over 1/2"

DUROCK Exterior Cement Board, or, (2) vinyl tile or carpet/pad over 1/2" oriented strand board. Ceilings consist of two layers 5/8" SHEETROCK brand Gypsum Panels, FIRECODE C Core, applied over RC-1 Resilient Channels. Installed within the cavity are 3" THERMAFIBER SAFB. Refer to *SA-924 Drywall/Wood Framed Systems* for additional information and details.

Direct Suspension—When additional ceiling space is needed to accommodate large ducts or pipes, gypsum panels are screw-attached below a direct suspension system. This direct-hung steel ceiling grid consists of main beam runners 4' o.c. and cross furring channels spaced 24" o.c. A cross-beam supports the edge of lighting fixtures. With 1/2" or 5/8" SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw-attached to this grid, a one-hour fire-rated wood joist floor/ceiling is provided. The assembly includes provision for lighting fixtures, air ducts and dampers.

Textured Ceilings—When water-based spray texture paint will be applied, 1/2" SHEETROCK brand Interior Gypsum Ceiling Board is ideal because it supports both the sprayed texture and insulation like 5/8" thick panels but at less cost. Framing may be at 24" o.c.

Renovation—To improve the sound control of wood framed floor-ceilings, 1/2" SHEETROCK brand Gypsum Panels, FIRECODE C Core, are screw-attached to 2" SHEETROCK Z-Furring Channels fastened to bottom of joists. With 2" THERMAFIBER SAFB between channels, the system provides 45 STC and 40 IIC ratings.

Exterior Soffits—Eaves, canopies, carports and other exterior soffits with indirect exposure to the weather are quickly and economically completed with SHEETROCK brand Exterior Gypsum Ceiling Board fastened directly to joists (see United States Gypsum Company Bulletin WB-1152 for detailed specification). Maximum frame spacing and other limitations for these systems are shown above.

Single-layer ceiling



Resilient channel with blankets



USG High Performance Floor/Ceiling System



Steel Framed Gypsum Board Systems

Steel-framed systems consist of one or two layers of SHEETROCK brand Gypsum Panels screw-attached to steel framing for light-weight, fire and sound-resistant assemblies. Panels are applied to Steel studs, RC-1 Resilient Channels or metal furring channels to meet design requirements for fixed interior partitions—divider, corridor, party and chase walls; furred and suspended ceilings; wall furring and column fireproofing.

Partitions

Single-Layer—With 5/8" SHEETROCK brand Gypsum Panels, FIRECODE C Core, applied to steel studs, set in runners. Provide economical 1-hour fire-rated partitioning for corridors or within units. Exclusive creased THERMAFIBER Sound Insulation systems offer 51 to 55 STC ratings and 1-hour fire ratings at the lower in-place costs of single-layer assemblies. A 1-hour rating is also available with 1/2" thick panels and 1 1/2" THERMAFIBER SAFB installed in the stud cavity.

Double-Layer—With 1/2" SHEETROCK brand Gypsum Panels, FIRECODE C Core, attached to 2 1/2" or 3 3/8" studs spaced 24" o.c. Provide a 2-hour fire rating plus sound control suitable for party walls.

Multilayer—With 1/2" SHEETROCK brand Gypsum Panels, FIRECODE C Core. Assemblies offer 3- and 4-hour fire ratings and up to 62 STC, yet are much lighter weight and thinner than concrete block. These assemblies also provide a 3-hour fire-resistant enclosure for steel trusses in staggered truss systems. Where added partition width is required, double rows of studs are erected to provide chase walls with up to 20 3/4" net pipe chase width.

Limitations

- 1 Non-load bearing.
- 2 Exposure to excessive or continuous moisture and extreme temperatures should be avoided.
- 3 Maximum frame spacing is 24" o.c., except when single-layer ceiling panels are applied with long edges parallel to joists and used as a base for spray-applied texture finish, max. frame spacing is 16" o.c.



Notice


The typical limiting height tables on page 14 are based on the suggested minimum physical and structural properties (I_x and S_x) shown in Tables 1 through 4 below. The physical and structural properties may vary by manufacturer. Request actual physical and structural property data from your local United States Gypsum Company representative or from your local steel framing manufacturer.

Typical physical properties—Interior stud framing **table 1**

	Stud designation	Stud width —in.	(mm)	Net area —in. ² (1)	Approx. wt.(2)	
					lb./ft	(kg/m)
	158ST25	1 1/2	41.3	0.085	0.33	0.49
	212ST25	2 1/2	63.5	0.102	0.38	0.57
	358ST25	3 3/8	92.1	0.123	0.45	0.67
	400ST25	4	101.6	0.130	0.48	0.71
	600ST25	6	152.4	0.167	0.61	0.91
	158ST22	1 1/2	41.3	0.100	0.45	0.67
	212ST22	2 1/2	63.5	0.103	0.53	0.79
	358ST22	3 3/8	92.1	0.135	0.64	0.95
	400ST22	4	101.6	0.146	0.68	1.01
	600ST22	6	152.4	0.203	0.88	1.31
	158ST20	1 1/2	41.3	0.144	0.56	0.83
	212ST20	2 1/2	63.5	0.173	0.73	1.09
	358ST20	3 3/8	92.1	0.210	0.85	1.27
	400ST20	4	101.6	0.223	0.90	1.34
	600ST20	6	152.4	0.288	1.17	1.74


(1) Net area excluding coating, through section at hole. (2) Average shipping weight including coating.

Typical structural properties—Interior stud framing **table 2**

	Stud desig. ⁽¹⁾	$I_x^{(2)}$ —in ⁴	$S_x^{(2)}$ —in ³	r_x —in	$I_y^{(2)}$ —in ⁴	$S_y^{(2)}$ —in ³	r_y —in	M_x (k-in) ⁽³⁾
	158ST25	0.038	0.040	0.678	0.018	0.024	0.484	0.795
	212ST25	0.101	0.071	1.012	0.019	0.024	0.480	1.393
	358ST25	0.239	0.113	1.415	0.019	0.024	0.464	2.234
	400ST25	0.302	0.123	1.545	0.019	0.024	0.459	2.441
	600ST25	0.773	0.184	2.209	0.019	0.024	0.427	3.633
	212ST22	0.155	0.110	1.008	0.032	0.037	0.475	2.187
	358ST22	0.367	0.182	1.410	0.033	0.037	0.460	3.606
	400ST22	0.463	0.209	1.539	0.033	0.038	0.454	4.133
	600ST22	1.224	0.342	2.202	0.034	0.038	0.422	6.762
	212ST20	0.175	0.123	1.006	0.039	0.044	0.473	2.706
	358ST20	0.414	0.213	1.407	0.045	0.046	0.458	4.698
	400ST20	0.523	0.246	1.536	0.046	0.047	0.452	5.423
600ST20	1.385	0.437	2.199	0.051	0.048	0.420	9.642	

(1) Indicates size, style and gauge: 158-1 1/2", ST-stud; 20-ga. thickness (see table below). Yield strength: all styles 33 ksi for ST and 40 ksi for SJ. (2) Effective properties based on AISI Specifications, 1986 edition. (3) Assuming full lateral support. For laterally unbraced structural member, see Section C3.1.2, AISI specifications, 1986 edition.

Typical structural properties—Steel runners **table 3**

	Runner ⁽¹⁾ designation	$I_x^{(2)}$ —in ⁴	$S_x^{(2)}$ —in ³	r_x —in	M_x (k-in) ⁽³⁾
	158CR25	0.025	0.022	0.663	0.443
	212CR25	0.070	0.043	0.992	0.848
	358CR25	0.172	0.061	1.366	1.209
	400CR25	0.222	0.068	1.488	1.340
	600CR25	0.629	0.101	2.115	1.990
	212CR22	0.116	0.073	1.035	1.450
	358CR22	0.281	0.128	1.417	2.533
	400CR22	0.354	0.149	1.541	2.949
	600CR22	0.989	0.220	2.185	4.360
	212CR20	0.147	0.095	1.007	1.871
	358CR20	0.328	0.160	1.416	3.170
	400CR20	0.415	0.185	1.541	3.670
	600CR20	0.111	0.304	2.183	6.020

(1) Yield strength is 33 ksi. (2) Effective properties based on AISI Specifications, 1986 edition. (3) Assuming full lateral support. For laterally unbraced structural member, see Section C3.1.2, AISI specifications, 1986 edition.

Thickness—Steel studs and runners(1) **table 4**

Style	Design(2)		Minimum		Gauge(3)
	in	mm	in	mm	
ST, CR25	0.0188	0.48	0.0179	0.45	25
ST, CR22	0.0284	0.72	0.0270	0.69	22
ST, CR20	0.0329	0.84	0.0312	0.79	20
SJ, JR20	0.0359	0.91	0.0341	0.87	20
SJ, CR18	0.0478	1.21	0.0454	1.15	18
SJ, CS, CR16	0.0598	1.52	0.0568	1.44	16
SJ, CS, CR14	0.0747	1.90	0.0710	1.80	14

(1) Uncoated steel thickness meets ASTM A568. Studs and runners meet ASTM C645. Coatings are galvanized per ASTM A525; aluminum-zinc per ASTM A792; or ASTM A591 (weights equivalent to A525). (2) Conforms to Sec. A3, AISI Specifications for the Design of Cold-Formed Steel Structural Members, 1986 edition. (3) For information only, refer to limiting height and structural properties table for design data.

Typical limiting heights—Interior partitions

table 5

Stud design.	Stud width	Stud spacing	Allow. defl.	Partition, one layer	Partition, two layers	Furring, one layer
25 gauge (.0179 min.)						
158ST25	1½"	16"	L/120 L/240 L/360	10'9"f 9'6"d 8'3"d	10'9"d 10'6"d 9'0"d	10'3"d 8'3"d 7'3"d
		24"	L/120 L/240 L/360	8'9"f 8'3"d 7'3"d	8'9"f 8'9"f 8'0"d	8'9"f 7'3"d 6'3"d
212ST25	2½"	16"	L/120 L/240 L/360	13'9"f 12'6"d 10'9"d	13'9"f 13'6"d 11'9"d	13'9"d* 11'0"d 9'9"d
		24"	L/120 L/240 L/360	11'3"f 10'9"d 9'6"d	11'3"f 11'3"f 10'3"d	11'3"f 9'9"d 8'6"d
358ST25	3½"	16"	L/120 L/240 L/360	16'9"f 16'0"d 14'0"d	16'9"f 16'9"f 14'9"d	16'9"f* 14'6"d* 12'9"d*
		24"	L/120 L/240 L/360	13'6"f 13'6"f 12'3"d	13'6"f 13'6"f 13'0"d	13'6"f* 12'9"d* 11'0"d*
400ST25	4"	16"	L/120 L/240 L/360	17'3"f 17'3"d 15'0"d	17'3"f 17'3"f 15'9"d	17'3"f* 15'9"d* 13'9"d*
		24"	L/120 L/240 L/360	14'3"f 14'3"f 13'0"d	14'3"f 14'3"f 13'9"d	14'3" f* 13'9" d* 12'0"d*
600ST25	6"	16"	L/120 L/240 L/360	20'0"f 20'0"f 20'0"f	20'0"f 20'0"f 20'0"f	20'0"f* 20'0"f* 18'9"f*
		24"	L/120 L/240 L/360	15'0"v 15'0"v 15'0"v	15'0"v 15'0"v 15'0"v	15'0"v* 15'0"v* 15'0"v*

22 gauge (.0270 min.)

212ST22	2½"	16"	L/120 L/240 L/360	16'6"d 13'0"d 11'6"d	17'0" f 14'0" d 12'3"d	15'3"d* 12'0"d 10'6"d
		24"	L/120 L/240 L/360	14'0"f 11'6"d 10'0"d	14'0"f 12'3"d 10'6"d	13'3"d* 10'6"d 9'3"d
358ST22	3½"	16"	L/120 L/240 L/360	21'9"d 17'3"d 15'0"d	22'0"f 18'0"d 15'9"d	20'3"d* 16'0"d* 14'0"d*
		24"	L/120 L/240 L/360	18'0"f 15'0"d 13'0"d	18'0"f 15'9"d 13'9"d	17'9"d* 14'0"d* 12'3"d*
400ST22	4"	16"	L/120 L/240 L/360	23'3"f 18'6"d 16'3"d	23'3"f 19'3"d 16'9"d	21'9"d* 17'3"d* 15'0"d*
		24"	L/120 L/240 L/360	19'0"f 16'3"d 14'0"d	19'0"f 16'9"d 14'9"d	19'0"f* 15'0"d* 13'3"d*
600ST22	6"	16"	L/120 L/240 L/360	29'0" f 25'3"d 22'0"d	29'0"f 26'0"d 22'9"d	29'0"f* 23'9"d* 20'9"d*
		24"	L/120 L/240 L/360	23'6"f 22'0"d 19'3" d	23'6"f 22'9"d 19'9"d	23'6"f* 20'9"d* 18'3"d*

Typical limiting heights—Interior partitions

Stud design.	Stud width	Stud spacing	Allow. defl.	Partition, one layer	Partition, two layers	Furring, one layer
20 gauge (.0312 min.)						
212ST20	2½"	16"	L/120 L/240 L/360	17'4"f 13'10"d 12'0"d	17'11"f 16'1"d 14'0"d	16'6"d* 13'0"d* 11'6"d
		24"	L/120 L/240 L/360	14'7"f 12'0"d 10'6"d	14'7"f 13'5"f 12'4"d	14'6"d* 11'6"d 10'0"d
358ST20	3½"	16"	L/120 L/240 L/360	22'7"d 17'11"d 15'7"d	23'8"f 20'2"d 17'8"d	21'9"d* 17'3"d* 15'0"d*
		24"	L/120 L/240 L/360	19'4"f 15'7"d 13'8"d	19'4"f 17'8"f 15'6"d	19'0"d* 15'0"d* 13'3"d*
400ST20	4"	16"	L/120 L/240 L/360	24'3"d 19'2"d 16'10"d	25'6"d 21'7"d 18'11"d	23'6"d* 18'9"d* 16'3"d*
		24"	L/120 L/240 L/360	20'9"f 16'10"d 14'8"d	20'9"f 18'11"d 16'6"d	20'6"d* 16'3"d* 14'3"d*
600ST20	6"	16"	L/120 L/240 L/360	32'11"d 26'1"d 22'10"d	33'11"f 28'6"d 24'11"d	32'3"d* 25'6"d* 23'3"d*
		24"	L/120 L/240 L/360	25'3"f 22'10"d 19'11"d	25'3"f 24'11"d 21'10"d	28'0"d* 22'3"d* 19'6"d*

SJ style (.0341 min.)

362SJ20	3½"	16"	L/120 L/240 L/360	24'0"d 19'0"d 16'9"d	25'0"d 19'9"d 17'3"d	23'0"d* 19'3"d* 16'0"d*
		24"	L/120 L/240 L/360	21'0"d 16'9"d 14'6"d	21'9"d 17'3"d 15'0"d	20'3"d* 16'0"d* 14'0"d*
400SJ20	4"	16"	L/120 L/240 L/360	25'9"d 20'6"d 18'0"d	26'9"d 21'3"d 18'6"d	24'9"d* 19'9"d* 17'3"d*
		24"	L/120 L/240 L/360	22'6"d 18'0"d 15'9"d	23'3"d 18'6"d 16'3"d	21'6"d* 17'3"d* 15'0"d*


Limiting height for ½" or ¾" thick gypsum panels and 5 psf uniform load perpendicular to partition or furring. Use one-layer heights for unbalanced assemblies; use two-layer heights for multi-layer assemblies. For furring, stud attached to top and bottom runners.

*Limiting criteria d—deflection, f—bending stress, V—end-reaction shear. Consult local code authority for limiting criteria.

Note: Other stud sizes and properties may be available to provide greater limiting heights. Contact United States Gypsum Company or stud manufacturer for details. On tall walls, as determined by the architect and/or structural engineer, L/240 or L/360 is recommended.

Typical limiting heights—Chase wall partitions

table 6

Stud ga.	Stud width	Stud spacing	Allow. defl.	One layer	Two layers
					
158ST25	1½"	16"	L/120 L/240 L/360	15'3"f 13'3"d 11'6"d	15'3"f 14'6"d 12'9"d
		24"	L/120 L/240 L/360	12'6"f 11'6"d 10'0"d	12'6"f 12'6"f 11'0"d
212ST25	2½"	16"	L/120 L/240 L/360	19'6"f 17'6"d 15'6"d	19'6"f 19'0"d 16'6"d
		24"	L/120 L/240 L/360	16'0"f 15'6"d 13'6"d	16'0"f 16'0"f 14'6"d
358ST25	3½"	16"	L/120 L/240 L/360	23'6"f 22'9"d 19'9"d	23'6"f 23'6"f 21'3"d
		24"	L/120 L/240 L/360	19'3"f 19'3"f 17'3"d	19'3"f 19'3"f 18'6"d

Limiting height for ½" or ¾" thick panels and 5 psf uniform load perpendicular to partition. Assemblies require vertical cross braces 4 ft. o.c. max. Use two-layer heights for multi-layer assemblies. Limiting criteria: d—deflection, f—bending stress. Consult local code authority for limiting criteria.

RC-1 Resilient Channel Partitions

In these thin, lightweight assemblies, horizontal RC-1 Resilient Channels, 24" o.c., are screw-attached one side of 3/8" steel studs spaced 24" o.c. and set in runners. Gypsum panels are screw-attached to these channels on one side and directly attached to the steel stud flanges on the opposite partition side. THERMAFIBER SAFB, 3" thick and 25" wide, are inserted and creased in the partition cavity. Because the blanket is wider than the cavity, it presses against the panels, thereby damping sound vibrations more effectively and offering 55 STC sound rating. (Use of a filler strip at the base may reduce STC rating.) Limiting heights for these assemblies are shown in the table below.

Limiting heights—Resilient channel assemblies⁽¹⁾

Stud desig.	Stud width	Stud spacing	Allow. defl.	One layer resilient partition
358ST25	3 3/8"	16"	L/120 L/240	16'7" 13'4"
		24"	L/120 L/240	13'6" 11'8"

(1) Limiting height for 3/8" thick gypsum panels and 5-psf uniform load perpendicular to partition. Studs attached to top and bottom runners on resilient side. Limiting criteria: d—deflection, f—bending stress; consult local code authority for limiting criteria.

Curved Drywall Partitions

Versatile SHEETROCK brand Gypsum Panels can be formed to almost any cylindrically curved surface. In addition, using SHEETROCK brand Gypsum Panels, FIRECODE C Core, will permit 1-hour to 4-hour fire-resistance ratings.

Gypsum panels are applied either dry or wet depending on the radius of curvature desired. To prevent flat areas between framing, shorter bend radii require closer than normal stud spacing.

Panels are horizontally applied, gently bent around framing and securely fastened to achieve the desired radius. When panels are applied dry, the minimum radius of curvature meets many applications (see table for dry gypsum panels). By moistening the face or back paper thoroughly prior to application and replacing the panels in a stack for at least one hour, the panels can be bent to still shorter radii (see table for wetted panels). When panels dry thoroughly, they regain original hardness.

Cutouts for electrical boxes are not recommended in curved surfaces unless they can be made after boards are installed and thoroughly dry.

Minimum bending radii of dry gypsum panel

Panel thickness		Panel applied with long dimension perpendicular to framing		Panel applied with long dimension parallel to framing	
in	mm	ft	m	ft	m
1/2	6.4	5	1.5	15	4.6
5/8	9.5	7 1/2	2.3	25	7.6
3/4	12.7	20 ⁽¹⁾	6.1	—	—

(1) Bending two 1/2" pieces successively permits radii shown for 1/2" gypsum panels.

Minimum bending radii of wetted gypsum panel⁽¹⁾

Panel thickness	Radius	Inside length of arc ⁽²⁾	Outside length of arc ⁽²⁾	No. of studs on arc including those at tangents ⁽³⁾	Approximate stud spacing c. to c. ⁽⁴⁾	Maximum stud spacing ⁽⁴⁾	Ounces of water required per panel side ⁽⁵⁾
1/8"	2'0"	3.14'	44.0"	9	5.50"	6"	30
1/4"	2'6"	3.93'	53.4"	10	5.93"	6"	30
3/8"	3'0"	4.71'	62.8"	9	7.85"	8"	35
1/2"	3'6"	5.50'	72.2"	11	7.22"	8"	35
5/8"	4'0"	6.28'	81.6"	8	11.70"	12"	45
3/4"	4'6"	7.07'	91.1"	9	11.40"	12"	45

(1) For gypsum board applied horizontally to a 4" thick partition.

(2) Arc length = $\frac{3.14 \cdot R}{2}$ (for a 90° arc).

(3) No. studs outside arc length/maximum spacing +1 (rounded up to next whole number).

(4) Stud spacing outside arc length/no. of studs -1 (measured along outside of runner).

(5) Wet only the side of panel that will be in tension. Water required per panel side is based on a 4' x 8' panel.

Shelf-Wall System

This system provides load-carrying walls for shelving in stores, offices, schools and other applications. Incorporating simple, quickly erected, economical steel stud components with Garcy shelf brackets, standards and accessories, the assembly offers advantages of steel stud-drywall construction plus structural strength to support shelving and merchandise.

The 3/8" steel studs spaced no more than 24" o.c. are securely fastened to floor and ceiling runners and surfaced with either single or double-layer SHEETROCK brand Gypsum Panels. Slotted standards are screw-fitted to studs or steel reinforcing inserted between layers.

The system provides a load-carrying partition but is not structurally load-bearing. Limiting height: 16'.

Fixture attachment load table

Fastener	Size		Base assembly	Allowable withdrawal resistance		Allowable shear resistance	
	in	mm		lb	N ⁽¹⁾	lb	N ⁽¹⁾
Type toggle bolt or hollow wall anchor	3/8	3.18	1/2" gypsum panel	20	89	40	178
	1/2	4.76		30	133	50	222
	3/4	6.35		40	178	60	267
	1/2	3.18	1/2" gypsum panel & 25-ga. steel stud	70	311	100	445
	1/2	4.76		80	356	125	556
	3/4	6.35		155	689	175	778
no. 8 sheet metal screw			1/2" gypsum panel & 25-ga. steel stud or 25-ga. steel insert	50	222	80	356
Type S bugle head screw				60	267	100	445
Type S-12 bugle head screw			1/2" gypsum panel & 20-ga. steel stud or 20-ga. steel insert	85	378	135	600
1/4" Type S pan head screw			25-ga. steel to 25-ga. steel	70	311	120	534
Type S-12			20-ga. steel to 20-ga. steel	53	235	133	591
two bolts welded to steel insert	3/8	4.76	grab bar attachment	175	778	200	890
	1/2	6.35		200	890	250	1112
bolt welded to 1 1/2" chan.	1/4	6.35	plumber's bracket	200	890	250	1112

(1) Newtons



Steel Stud Chase Wall

Chase walls consist of a double row of steel studs with gypsum panel cross braces between rows. Double-layer ½" SHEETROCK brand Gypsum Panels are screw-applied on both sides of studs and 1½" THERMAFIBER SAFB are stapled to the back side of one base layer. The assembly offers 55 STC, suitable for party walls, and a 2-hour fire-resistance rating when ½" SHEETROCK brand Gypsum Panels, FIRECODE C Core, are used.

As an alternate, 2½" steel stud cross braces screw-attached to chase wall studs may be used. When chase wall studs are not directly opposite, steel stud cross braces 24" o.c. are anchored to horizontal 2½" runners screw-attached to chase wall studs.

Limiting thickness is max. 24" with gypsum board braces; brace spacing 48" o.c. max. vertically; limiting heights are shown on page 14. Other chase walls providing greater height may be constructed with wider or heavier steel studs (see tables, page 14, for design data).

Wall Furring

Interior and exterior walls are readily furred using ½" SHEETROCK brand Gypsum Panels, Foil-Back, screw-attached to steel framing erected vertically. In these systems, one of three different framing methods may be used to provide a vapor retarder, thermal insulation, and chase space for pipes, conduits and ducts.

With SHEETROCK Z-Furring Channels—In this assembly, SHEETROCK Z-Furring Channels are spaced 24" o.c. THERMAFIBER Fire Safety FS-15 Blankets or rigid foam insulations are friction-fit to interiors of exterior walls. Gypsum panels are screw-attached to channel flanges to provide a drywall surface isolated to a great degree from the masonry wall. In new construction and remodeling, this system provides a highly insulative self-furring solid back-up for SHEETROCK brand Gypsum Panels.

Thermal resistance (R) values for various assemblies are shown below.

With Metal Furring Channels—These furring channels, erected vertically 24" o.c., are fastened directly to interiors of exterior walls of monolithic concrete and virtually any type of masonry—brick, concrete block or tile. Channels may be furred using adjustable wall furring brackets and ¾" cold-rolled channels to provide additional space for pipes, conduits or ducts.

With Steel Studs—This free-standing furring system provides maximum clear chase space and minimizes possibilities for photographing or shadowing to occur over fasteners and furring members. Assembly consists of stud framing which is secured to the exterior wall with brackets at mid-height when heights greater than 12'1" are required. The adjustable wall furring bracket is anchored to the exterior wall and attached to each stud web with a ¾" Type S pan head screw. Furring providing greater height may be constructed with wider or heavier steel studs.



Installing insulation



Attaching Z-furring channel



Erecting gypsum panel



Screw-attaching panel



Design thermal resistance (R) values⁽¹⁾ with SHEETROCK Z-Furring Channel System

Wall construction	Nom. wall thickn.	Uninsul. wall	Furred wall ⁽²⁾ (no. insul.)	Wall insulated with— ⁽²⁾											
				THERMAFIBER Fire Safety FS-15 Blankets				Rigid polystyrene				Rigid urethane			
				1" (4.17)	1½" (6.00)	2" (8.00)	3" (12.00)	1" (5.00)	1½" (7.50)	2" (10.00)	3" (15.00)	1" (6.25)	1½" (9.38)	2" (12.50)	3" (18.75)
4" face brick & 8" cinder block	12"	3.01	4.38	7.63	9.46	11.46	15.46	8.46	10.96	13.46	18.46	9.71	12.84	15.96	22.21
4" face brick & 4" com. brick	8"	2.09	3.46	6.71	8.54	10.54	14.54	7.54	10.04	12.54	17.54	8.79	11.92	15.04	21.29
poured conc. (140 lb./cu. ft.)	8"	1.49	2.86	6.11	7.94	9.94	13.94	6.94	9.44	11.94	16.94	8.19	11.32	14.44	20.69
12" conc. block & 4" face brick	16"	2.57	3.94	7.19	9.02	11.02	15.02	8.02	10.52	13.02	18.02	9.27	12.40	15.52	21.77

(1) Resistances based on procedures and design values from 1981 ASHRAE Handbook of Fundamentals, winter conditions (15 mph wind) and neglect the effect of furring channels and fasteners. (2) Interior wall finish: ½" SHEETROCK brand Gypsum Panels, Foil-Back, (R-0.45). R-values for insulation shown in parentheses, based on 75°F. mean temperature for insulation and components.

Column Fireproofing

Drywall systems for column fireproofing consist of SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw-attached to 1½" steel studs at column corners. DUR-A-BEAD or SHEETROCK No. 800 Corner Bead concealed with a United States Gypsum Company joint compound resists damage from impact at exterior corners.

These systems are easily and quickly installed without waiting for adhesives to dry. They provide lightweight, thin, compact steel column fire protection of up to four hours depending on the construction. Increased fire protection of primary structural framing members usually permits lower insurance premiums.

Drywall Soffits

Soffit assembly consists of galvanized steel channel runners and studs faced with SHEETROCK brand Gypsum Panels, screw attached. It is a lightweight, fast and economical method of filling over cabinets or lockers and of housing overhead ducts, pipes or conduits. The braced system permits constructing soffits with depths to 48" (vertically) and widths to 72" (horizontally). The unbraced system is for soffits up to 24" x 24". SHEETROCK brand Exterior Gypsum Ceiling Board is ideal for exterior ceilings and soffits with indirect weather exposure.

Maximum braced soffit width and depth dimensions⁽¹⁾

Gypsum board thickness ⁽²⁾		Steel stud size		Maximum width		Max. depth for max. width shown	
in	mm	in	mm	in	mm	in	mm
½	12.7	1½	41.3	60	1500	48	1200
¾	12.7	2½, 3½	63.5, 92.1	72	1800	36	900
1	15.9	1½	41.3	60	1500	30	800
1½	15.9	2½, 3½	63.5, 92.1	72	1800	18	500

(1) The construction is not designed to support loads other than its own dead weight and should not be used where it may be subjected to excessive abuse.

(2) The double-layer system and ¾" thick gypsum panels are not recommended for this construction.

Ceilings

Steel-framed floor/ceiling assemblies consist of SHEETROCK brand Gypsum Panels screw-attached to Metal Furring Channels clipped or wire-tied to suspended runner channels or wire-tied to supports. Or panels may also be screw-attached to a direct suspension system. And for long spans to accommodate large ducts or pipes in the ceiling space, the steel stud is used as ceiling furring or in a separate system.

The steel stud framing system is ideal for ceilings over office areas in pitched-roof buildings and in modular buildings where ceiling framing is independent of the floor above; accommodates light troffers, ducting and electrical services.

Gypsum panels for these assemblies are available in ½" and ¾" thicknesses and in five types. SHEETROCK brand Gypsum Panels,

Foil-Back, offer an effective vapor retarder. Regular gypsum panels provide a firm base for acoustical tile adhesively applied. SHEETROCK brand Exterior Gypsum Ceiling Board is suitable for exterior ceilings and SHEETROCK brand Gypsum Panels, FIRECODE or FIRECODE C Core, can be used to obtain required fire ratings.

Limitations

- Steel studs are not designed to carry live loads, mechanical equipment or material storage.
- Maximum spacing: 1½" cold-rolled channels and hangers, 48" o.c. For single-layer panels, maximum steel stud and furring channel spacing is 24" o.c. for perpendicular application and 16" o.c. for parallel application. For panels used as base for spray-applied texture finish, maximum frame spacing is 16" o.c. for ½" thick panels perpendicularly applied; parallel panel application not recommended. (Refer to pages 4 and 12 for information on ½" SHEETROCK brand Interior Gypsum Ceiling Board.)

Limiting spans⁽¹⁾—Metal Furring Channels⁽²⁾

Type furring member	Member spacing (in. o.c.)	Single layer panels (2.5 psf max.)		Double layer panels (5.0 psf max.)	
		1-span	3-span	1-span	3-span
DWC-25 (hemmed)	16 24	5'9" 5'0"	7'1" 6'2"	4'7" 4'0"	5'8" 4'11"
DWC-20 (unhemmed)	16 24	6'11" 6'0"	8'6" 7'5"	5'5" 4'9"	6'9" 5'11"

(1) Between beams, joists, purlins, sub-purlins; not including 1½" cold-rolled channel support spaced 4'0" max.

(2) Limiting spans for ½" and ¾" thick panels, max. L/240 deflection and uniform load shown. Investigate concentrated loads such as light fixtures and exhaust fans separately.



Limiting spans(°)—Steel Stud ceiling system⁽¹⁾

Stud style			212ST25			358ST25 ⁽²⁾			400ST25 ⁽²⁾			212ST20			358ST20			400ST20			600ST20		
Stud spacing-in.			12	16	24	12	16	24	12	16	24	12	16	24	12	16	24	12	16	24	12	16	24
Single span																							
Uniform load —psf	5	10'11"	9'11"	8'8"	14'7"	13'3"	11'7"	15'9"	14'4"	12'6"	13'2"	11'11"	10'5"	17'6"	15'11"	13'11"	19'0"	17'3"	15'0"	26'3"	23'10"	20'10"	
	10	8'8"	7'11"	6'9"	11'7"	10'6"	7'3"	12'6"	11'0"	9'0"	10'5"	9'6"	8'3"	13'11"	12'8"	11'0"	15'0"	13'8"	11'11"	20'10"	18'11"	16'6"	
	15	7'7"	6'10"	4'9"	9'8"	7'3"	4'9"	10'4"	9'0"	6'8"	9'1"	8'3"	7'3"	12'2"	11'0"	9'8"	13'2"	11'11"	10'4"	18'2"	16'6"	13'11"	
	20	6'9"	5'4"	—	7'3"	5'5"	—	9'0"	7'6"	5'0"	8'3"	7'6"	6'4"	11'0"	10'0"	8'4"	11'11"	10'10"	9'0"	16'6"	14'9"	12'0"	
Double and triple span																							
Uniform load —psf	5	13'6"	12'4"	10'2"	17'5"	14'8"	11'2"	17'6"	14'7"	11'0"	16'4"	14'10"	12'11"	21'9"	19'9"	17'8"	23'6"	21'4"	18'8"	32'6"	29'6"	25'9"	
	10	10'2"	8'8"	6'11"	11'2"	9'2"	6'8"	11'0"	8'9"	6'3"	12'11"	11'9"	10'1"	17'3"	15'8"	13'3"	18'8"	16'11"	14'3"	25'9"	21'10"	16'10"	
	15	8'2"	6'11"	5'9"	8'4"	6'8"	4'9"	8'0"	6'3"	4'4"	11'4"	10'0"	8'2"	15'0"	13'3"	10'10"	16'3"	14'3"	11'7"	20'3"	16'10"	13'10"	
	20	6'11"	5'9"	4'4"	6'8"	5'3"	—	6'3"	4'10"	—	10'0"	8'9"	7'1"	13'3"	11'6"	9'4"	14'3"	12'4"	9'9"	16'10"	13'10"	10'2"	

(1) Based on L/240 allowable deflection. Bracing of top flanges is required and must not exceed 48" o.c. (2) Stud end stiffening required. Additional hangers are necessary when span area exceeds 16 ft².

ULTRACODE Core Panel Systems

New 3/4" SHEETROCK brand Gypsum Panel, ULTRACODE Core, provides a 1-hr. fire-rating with single-layer construction without insulation, a 2-hr. fire-rating with single-layer construction including insulation. Also, 4-hr. fire-rated walls built with ULTRACODE Core panels require only 2 layers compared to the previously required 4 layers of board. These innovations in system designs were made possible because of U.S. Gypsum Company's development of a new SHEETROCK brand Gypsum Panel with a specially formulated gypsum core—the ULTRACODE Core. Panels are 3/4" thick, 4' wide, and are available in 8', 9', 10' and 12' lengths (nonstandard lengths available with minimum quantities). Panel weight: 2.8 psf.

Reduced Labor Costs—Because fewer 3/4" ULTRACODE Core panel layers are needed to achieve steel framed 2-hr., 3-hr. and 4-hr. fire ratings, the labor of installing additional layers is eliminated.

Reduced Material Costs—The number of fasteners required for 3/4" ULTRACODE Core panel installation is greatly reduced and the cost of joint treatment, sometimes used for sheet lamination or fire taping base layers in double-layer installations, is eliminated.

Panel Strength—Because of the ULTRACODE Core panel's added strength, it is an ideal product for use in partial height partitions where wall stiffness is critical. Also, panel edges are less prone to fastener blowouts, minimizing potential joint imperfections.

Fire Protection—Fire-rated systems include UL Designs U435, U436, U490, U491, U492, U496 and X528, all described below and in the Architectural Specifications. (UL Design X526 also allows for ULTRACODE Panels.)

Partition Assembly



UL Design U496—1 hr.
1 1/2" steel stud
1 layer, 3/4" SHEETROCK brand Gypsum Panel, ULTRACODE Core, each side

Partition Assembly



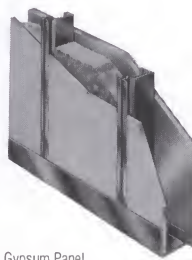
UL Design U491—2 hr.
3/2" or 3/4" steel stud
3" THERMAFIBER SAFB
1 layer, 3/4" SHEETROCK brand Gypsum Panel, ULTRACODE Core, each side

Partition Assembly



UL Design U435—3 hr.
1 1/2" Steel stud
2 layers, 3/4" SHEETROCK brand Gypsum Panel, ULTRACODE Core, each side

Cavity Shaft Wall Assembly



UL Design U492—2 hr.
4" USG C-H Steel Stud
3" THERMAFIBER SAFB
1 layer, 3/4" SHEETROCK brand Gypsum Panel, ULTRACODE Core, one side 1 layer, 1" SHEETROCK brand Gypsum Liner Panel, other side

Chase Wall Assembly



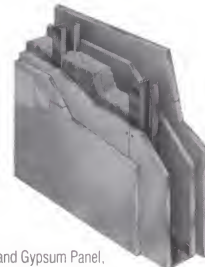
UL Design U436—3 hr.
1 1/2" Steel studs in two rows
2 layers, 3/4" SHEETROCK brand Gypsum Panel, ULTRACODE Core, each side

Column Assembly



UL Design X528—2 hr. or 3 hr.
1 1/2" steel studs at corners
For 2-hr.: 2 layers, 3/4" SHEETROCK brand Gypsum Panel, ULTRACODE Core, around column
For 3-hr.: 3 layers 3/4" SHEETROCK brand Gypsum Panel, ULTRACODE Core, around column, with second layer wrapped with steel wire 24" o.c.

Partition Assembly



UL Design U490—4 hr.
2 1/2" steel stud
2" THERMAFIBER SAFB
2 layers, 3/4" SHEETROCK brand Gypsum Panel, ULTRACODE Core, each side

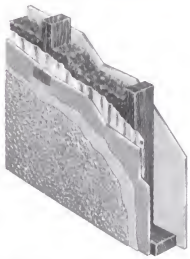
Faster Construction—The easily cut 3/4" ULTRACODE Core panels apply quickly, permit painting or other decoration, and the installation of trim, almost immediately. Contractors can get more work done in less time. Thus building occupancy and related revenues are realized sooner.

Sound Attenuation—The value of the ULTRACODE Panel systems is enhanced by excellent Sound Transmission Classification ratings.



Lightweight Framing Systems for Exterior Non-load Bearing Curtain Walls

Exterior curtain wall systems with steel framing have been in use for over 30 years and adapt easily to basic design concepts using conventional materials, methods and equipment. These systems have been specified in all parts of the world for office buildings, schools, shopping centers, motels, hotels and apartments.



**DUROCK Exterior Finish over
DUROCK Exterior Cement Board**



Glass-fiber reinforced concrete



Stucco exterior



Masonry veneer exterior

Features

Versatile Designs—Exterior stucco surfaces offer textural expression of smooth monolithic surfaces or random sculptural relief. Color and texture can be varied by addition of coarse colored aggregates which contrast boldly with brick, glass and concrete.

Surface Finishes—Interior and exterior facings in various combinations meet specific functional and esthetic needs.

Fire Resistant—2-hour rating available.

Sound Isolation—The attenuating effect of air space and insulation within the framing cuts noise transmitted to the interior.

Thermal Performance—Systems will accommodate energy design requirements for heated and air-conditioned buildings. Greater insulation values are attainable in less wall thickness with steel framing than can be attained with block or concrete.

Lightweight—Systems cut weight of brick masonry walls by 25%, of textured panel assemblies up to 66%, to reduce structural foundation requirements.

Air and Water Infiltration—Watertight construction is ensured when gypsum sheathing is covered with No. 15 asphalt felt or TYVEK Housewrap sheets, airtight construction when sealants are used in appropriate locations to maintain continuity of air/water barriers, particularly at windows, doors and other penetrations of exterior wall.

Framing Systems

Steel studs are channel-shaped and roll-formed from steel with corrosion-resistant coating, provide the wall framing with interior drywall, veneer finish and conventional plaster systems. They are an ideal back-up for brick veneer assemblies, reducing dead load 25% in comparison to concrete block backings. The wide choice of stud sizes and spacings accommodates insulation requirements, allows wall heights to 30', wind loads to 40 psf, and a variety of building modules. Requirements for greater wall heights and wind loads usually can be met. Consult architect and/or structural engineer for details.

Exterior Surfaces

Exterior surfaces may be unit masonry, portland cement-lime stucco or various decorative panels or siding materials. Brick or other masonry units are laid with a portland cement mortar and BONDCRETE Masons Lime and secured every 2½ sq. ft. with brick anchors screw-attached through the sheathing to steel studs. This system offers speedier building enclosure, the superior protection of a double-cavity wall and greater variety of insulation options.

Interior Surfaces

Interior surfaces may be gypsum drywall or high-strength veneer finish. Hundreds of variations in finishes ranging from smooth trowel to oriental-style textures, painted or fabric covered, are available for interior design.

With gypsum drywall, where a vapor retarder is required on the interior side, SHEETROCK brand Gypsum Panels, Foil-Back, ½" or ⅝" thick, are screw-attached to the steel studs. SHEETROCK brand Gypsum Panels, Foil-Back, FIRECODE Core, provide additional resistance to fire exposure, and are used in assemblies where a fire rating is required.

Veneer plaster finish interiors that require a vapor retarder on the interior side have Foil-Back IMPERIAL Gypsum Base screw-attached to steel studs. IMPERIAL Finish or DIAMOND Interior Finish is applied ⅛" to ⅜" thick over this 4" wide base.

Limitations

- 1 Non-load bearing constructions.
- 2 All details, specifications, and data computations from this publication concerning exterior framing systems are intended as a general guide for use in wall construction. NO PRODUCT SHOULD BE SPECIFIED OR USED IN ANY DESIGN OR CONSTRUCTION OF ANY STRUCTURE WITHOUT COMPLETE AND DETAILED EVALUATION BY A QUALIFIED STRUCTURAL ENGINEER AND/OR ARCHITECT TO VERIFY THE SUITABILITY OF THE PRODUCT DESCRIBED HEREIN FOR USE IN A GIVEN STRUCTURE.
- 3 For exterior framing systems, United States Gypsum Company assumes no liability for failure resulting from use of alternative materials or improper application or installation of any exterior framing system as selected by the design professional.

Stud Selection

To help select the best stud product to use with various exterior finishes in exterior walls, a limiting height table is shown on page 20. This table provides simple span limiting height guidelines for wind loads from 15 psf to 40 psf, three stud spacings, maximum allowable deflection and basic wall design properties. This table considers design when the exterior brick veneer is supported by ledger angles at each floor and the curtain wall framing and interior finish are supported at each floor. When brick veneer is continuous and supported at the foundation and periodically at the structure, follow Brick Institute of America Technical Notes for design information. Values in table are computed in accordance with AISI Specification for the Design of Cold-Formed Steel Structural Members, 1986 edition.

Curtain Wall, Non-Load Bearing, Limiting Heights Exterior Stud Framing-SJ style ($F_y = 40$ ksi)

Limiting heights calculated using stud properties⁽¹⁾

Design criteria		Simple span limiting heights ⁽¹⁾ for steel studs by size and gauge																stud properties only			
		3 1/2" stud-362SJ				4" stud-40SJ				6" stud-60SJ				7 1/2" stud-725SJ							
Wind load	Deflection limitation	20	18	16	14	20	18	16	14	20	18	16	14	18	16	14	12	18	16	14	12
15 psf	L/240	13'4"	14'7"	15'9"	16'10"	14'4"	15'8"	16'11"	18'2"	19'10"	21'9"	23'7"	25'3"	25'4"	27'6"	29'6"	29'6"	27'6"	29'10"	32'0"	32'0"
	L/360	12'1"	13'3"	14'4"	15'4"	13'0"	14'3"	15'5"	16'6"	18'0"	19'9"	21'5"	22'11"	23'0"	25'0"	26'9"	26'9"	25'0"	27'1"	29'1"	29'1"
	L/600	10'7"	11'7"	12'6"	13'4"	11'4"	12'5"	13'5"	14'5"	15'9"	17'3"	18'6"	20'0"	20'2"	21'10"	22'8"	22'8"	20'2"	21'10"	23'8"	25'4"
	L/240	11'8"	12'9"	13'9"	14'9"	12'6"	13'8"	14'10"	15'10"	17'4"	19'0"	20'7"	22'1"	22'2"	24'0"	25'9"	25'9"	22'2"	24'0"	26'0"	27'11"
20 psf	L/240	10'7"	11'7"	12'6"	13'4"	11'4"	12'5"	13'5"	14'5"	15'9"	17'3"	18'6"	20'0"	20'2"	21'10"	22'8"	22'8"	18'8"	20'3"	22'0"	23'7"
	L/360	9'7"	10'6"	11'4"	12'2"	10'4"	11'4"	12'3"	13'1"	14'4"	15'8"	17'0"	18'2"	18'3"	19'10"	21'3"	21'3"	17'0"	18'5"	19'11"	21'5"
	L/600	8'5"	9'2"	9'11"	10'7"	9'0"	9'11"	10'8"	11'5"	12'6"	13'8"	14'10"	15'11"	16'0"	17'4"	18'7"	18'7"	14'0"	16'1"	17'3"	18'8"
	L/240	11'1"	12'1"	13'0"	13'11"	11'10"	12'11"	13'0"	14'0"	15'0"	16'5"	17'11"	18'5"	18'0"	19'9"	21'5"	22'11"	23'0"	25'0"	27'1"	29'0"
25 psf	L/240	10'2"	11'2"	12'1"	12'11"	11'0"	12'0"	13'0"	13'11"	15'2"	16'8"	18'0"	19'4"	19'5"	21'1"	22'7"	22'7"	17'0"	18'5"	19'11"	21'5"
	L/360	8'11"	9'9"	10'6"	11'3"	9'7"	10'6"	11'4"	12'2"	13'3"	14'7"	15'9"	16'11"	17'0"	18'5"	19'9"	19'9"	13'5"	14'7"	15'10"	17'0"
	L/600	7'1"	7'9"	8'4"	8'11"	7'7"	8'4"	9'0"	9'8"	10'7"	12'1"	13'3"	14'4"	15'5"	16'9"	17'11"	17'11"	12'0"	13'3"	14'4"	15'10"
	L/240	11'3"	12'3"	13'3"	14'4"	12'1"	13'3"	14'4"	15'4"	16'9"	18'4"	19'10"	21'3"	21'5"	23'2"	24'10"	24'10"	18'5"	19'9"	21'5"	23'7"
30 psf	L/240	9'7"	10'6"	11'4"	12'2"	10'4"	11'4"	12'3"	13'1"	14'5"	15'8"	17'0"	18'2"	18'3"	19'10"	21'3"	21'3"	16'0"	17'4"	18'7"	20'2"
	L/360	8'5"	9'2"	9'11"	10'7"	9'0"	9'11"	10'8"	11'5"	12'6"	13'8"	14'10"	15'11"	16'0"	17'4"	18'7"	18'7"	13'7"	14'6"	15'9"	17'0"
	L/600	7'1"	7'9"	8'4"	8'11"	7'7"	8'4"	9'0"	9'8"	10'7"	12'1"	13'3"	14'4"	15'5"	16'9"	17'11"	17'11"	12'0"	13'3"	14'4"	15'10"
	L/240	10'1"	11'0"	11'10"	12'8"	10'10"	11'10"	12'9"	13'8"	15'0"	16'5"	17'9"	19'0"	19'1"	20'9"	22'3"	22'3"	18'10"	20'5"	21'11"	23'1"
35 psf	L/240	8'0"	8'9"	9'5"	10'1"	8'7"	9'5"	10'2"	10'10"	11'10"	13'0"	14'1"	15'1"	15'2"	16'5"	17'8"	17'8"	16'5"	17'10"	19'2"	21'1"
	L/360	6'2"	6'9"	7'4"	7'10"	6'9"	7'3"	7'10"	8'5"	9'3"	10'1"	10'11"	11'9"	11'9"	12'9"	13'8"	13'8"	12'9"	13'10"	14'10"	16'0"
	L/600	5'0"	5'10"	5'5"	6'11"	5'0"	5'11"	5'8"	6'4"	7'3"	8'0"	8'10"	8'6"	8'6"	9'5"	10'1"	10'1"	8'6"	9'5"	10'1"	11'1"
	L/240	10'1"	11'0"	11'10"	12'8"	10'10"	11'10"	12'9"	13'8"	15'0"	16'5"	17'9"	19'0"	19'1"	20'9"	22'3"	22'3"	18'10"	20'5"	21'11"	23'1"
40 psf	L/240	8'0"	8'9"	9'5"	10'1"	8'7"	9'5"	10'2"	10'10"	11'10"	13'0"	14'1"	15'1"	15'2"	16'5"	17'8"	17'8"	16'5"	17'10"	19'2"	21'1"
	L/360	6'2"	6'9"	7'4"	7'10"	6'9"	7'3"	7'10"	8'5"	9'3"	10'1"	10'11"	11'9"	11'9"	12'9"	13'8"	13'8"	12'9"	13'10"	14'10"	16'0"
	L/600	5'0"	5'10"	5'5"	6'11"	5'0"	5'11"	5'8"	6'4"	7'3"	8'0"	8'10"	8'6"	8'6"	9'5"	10'1"	10'1"	8'6"	9'5"	10'1"	11'1"
	L/240	10'1"	11'0"	11'10"	12'8"	10'10"	11'10"	12'9"	13'8"	15'0"	16'5"	17'9"	19'0"	19'1"	20'9"	22'3"	22'3"	18'10"	20'5"	21'11"	23'1"
45 psf	L/240	8'0"	8'9"	9'5"	10'1"	8'7"	9'5"	10'2"	10'10"	11'10"	13'0"	14'1"	15'1"	15'2"	16'5"	17'8"	17'8"	16'5"	17'10"	19'2"	21'1"
	L/360	6'2"	6'9"	7'4"	7'10"	6'9"	7'3"	7'10"	8'5"	9'3"	10'1"	10'11"	11'9"	11'9"	12'9"	13'8"	13'8"	12'9"	13'10"	14'10"	16'0"
	L/600	5'0"	5'10"	5'5"	6'11"	5'0"	5'11"	5'8"	6'4"	7'3"	8'0"	8'10"	8'6"	8'6"	9'5"	10'1"	10'1"	8'6"	9'5"	10'1"	11'1"
	L/240	10'1"	11'0"	11'10"	12'8"	10'10"	11'10"	12'9"	13'8"	15'0"	16'5"	17'9"	19'0"	19'1"	20'9"	22'3"	22'3"	18'10"	20'5"	21'11"	23'1"
50 psf	L/240	8'0"	8'9"	9'5"	10'1"	8'7"	9'5"	10'2"	10'10"	11'10"	13'0"	14'1"	15'1"	15'2"	16'5"	17'8"	17'8"	16'5"	17'10"	19'2"	21'1"
	L/360	6'2"	6'9"	7'4"	7'10"	6'9"	7'3"	7'10"	8'5"	9'3"	10'1"	10'11"	11'9"	11'9"	12'9"	13'8"	13'8"	12'9"	13'10"	14'10"	16'0"
	L/600	5'0"	5'10"	5'5"	6'11"	5'0"	5'11"	5'8"	6'4"	7'3"	8'0"	8'10"	8'6"	8'6"	9'5"	10'1"	10'1"	8'6"	9'5"	10'1"	11'1"
	L/240	10'1"	11'0"	11'10"	12'8"	10'10"	11'10"	12'9"	13'8"	15'0"	16'5"	17'9"	19'0"	19'1"	20'9"	22'3"	22'3"	18'10"	20'5"	21'11"	23'1"
55 psf	L/240	8'0"	8'9"	9'5"	10'1"	8'7"	9'5"	10'2"	10'10"	11'10"	13'0"	14'1"	15'1"	15'2"	16'5"	17'8"	17'8"	16'5"	17'10"	19'2"	21'1"
	L/360	6'2"	6'9"	7'4"	7'10"	6'9"	7'3"	7'10"	8'5"	9'3"	10'1"	10'11"	11'9"	11'9"	12'9"	13'8"	13'8"	12'9"	13'10"	14'10"	16'0"
	L/600	5'0"	5'10"	5'5"	6'11"	5'0"	5'11"	5'8"	6'4"	7'3"	8'0"	8'10"	8'6"	8'6"	9'5"	10'1"	10'1"	8'6"	9'5"	10'1"	11'1"
	L/240	10'1"	11'0"	11'10"	12'8"	10'10"	11'10"	12'9"	13'8"	15'0"	16'5"	17'9"	19'0"	19'1"	20'9"	22'3"	22'3"	18'10"	20'5"	21'11"	23'1"
60 psf	L/240	8'0"	8'9"	9'5"	10'1"	8'7"	9'5"	10'2"	10'10"	11'10"	13'0"	14'1"	15'1"	15'2"	16'5"	17'8"	17'8"	16'5"	17'10"	19'2"	21'1"
	L/360	6'2"	6'9"	7'4"	7'10"	6'9"	7'3"	7'10"	8'5"	9'3"	10'1"	10'11"	11'9"	11'9"	12'9"	13'8"	13'8"	12'9"	13'10"	14'10"	16'0"
	L/600	5'0"	5'10"	5'5"	6'11"	5'0"	5'11"	5'8"	6'4"	7'3"	8'0"	8'10"	8'6"	8'6"	9'5"	10'1"	10'1"	8'6"	9'5"	10'1"	11'1"
	L/240	10'1"	11'0"	11'10"	12'8"	10'10"	11'10"	12'9"	13'8"	15'0"	16'5"	17'9"	19'0"	19'1"	20'9"	22'3"	22'3"	18'10"	20'5"	21'11"	23'1"
70 psf	L/240	8'0"	8'9"	9'5"	10'1"	8'7"	9'5"	10'2"	10'10"	11'10"	13'0"	14'1"	15'1"	15'2"	16'5"	17'8"	17'8"	16'5"	17'10"	19'2"	21'1"
	L/360	6'2"	6'9"	7'4"	7'10"	6'9"	7'3"	7'10"	8'5"	9'3"	10'1"	10'11"	11'9"	11'9"	12'9"	13'8"	13'8"	12'9"	13'10"	14'10"	16'0"
	L/600	5'0"	5'10"	5'5"	6'11"	5'0"	5'11"	5'8"	6'4"	7'3"	8'0"	8'10"	8'6"	8'6"	9'5"	10'1"	10'1"	8'6"	9'5"	10'1"	11'1"
	L/240	10'1"	11'0"	11'10"	12'8"	10'10"	11'10"	12'9"	13'8"	15'0"	16'5"	17'9"	19'0"	19'1"	20'9"	22'3"	22'3"	18'10"	20'5"	21'11"	23'1"
80 psf	L/240	8'0"	8'9"	9'5"	10'1"	8'7"	9'5"	10'2"	10'10"	11'10"	13'0"	14'1"	15'1"	15'2"	16'5"	17'8"	17'8"	16'5"	17'10"	19'2"	21'1"
	L/360	6'2"	6'9"	7'4"	7'10"	6'9"	7'3"	7'10"	8'5"	9'3"	10'1"	10'11"	11'9"	11'9"	12'9"	13'8"	13'8"	12'9"	13'10"	14'10"	16'0"
	L/600	5'0"	5'10"	5'5"	6'11"	5'0"	5'11"	5'8"	6'4"	7'3"	8'0"	8'10"	8'6"	8'6"	9'5"	10'1"	10'1"	8'6"	9'5"	10'1"	11'1"
	L/240	10'1"	11'0"	11'10"	12'8"	10'10"	11'10"	12'9"	13'8"	15'0"	16'5"	17'9"	19'0"	19'1"	20'9"	22'3"	22'3"	18'10"	20'5"	21'11"	23'1"

Cavity Shaft Walls

USG Cavity Shaft Walls are non-load bearing gypsum board partition assemblies designed for erection from outside the shaft at each floor. Shafts are enclosed early in construction, the walls finished later along with interior partitions. This fast-installation feature combined with low-cost materials and high performance values, makes USG Cavity Shaft Walls superior enclosures for elevator and mechanical shafts, air ducts and stairwells in multi-story buildings.

USG Cavity Shaft Walls are covered by three model building codes under NER 258. In addition to a 1½" deep x 22½" wide vertical chaseway, the C-H stud used has 1" dia. holes 16" from each end for horizontal conduit runs. A 3" deep chase to carry electrical elevator controls is available with the 4" C-H stud and a 5" chase for 6" studs.

The assemblies are simply constructed of SHEETROCK brand Gypsum Panels, FIRECODE C Core, or IMPERIAL FIRECODE "C" Gypsum Base and veneer finish, steel studs and runners, and SHEETROCK brand Gypsum Liner Panels.

Liner panels are installed vertically between USG Steel J-Runners attached to floor and ceiling. Panel edges are inserted into specially formed USG Steel C-H Studs spaced 24" o.c. The 2-hour shaft wall is completed with double-layer ½" thick gypsum panels and a United States Gypsum Company joint system, or with gypsum base and veneer finish applied to one side. Where both sides of the wall must be finished, single-layer panels are applied to each side of studs. A 1-hour assembly is obtained with single-layer ½" thick face panels. Additional layers of panels are installed in 3- and 4-hour fire-rated construction.

USG Cavity Shaft Wall Systems have been designed and tested using accepted engineering practices with deflection criteria of L/120, L/240, and L/360 clear partition heights. Additionally, limiting height tables listed herein account for flexural and shear forces. A wide range of product and installation combinations is available to meet performance requirements: intermittent air pressure loading of 5, 7½, 10, 15 psf; vertical heights in three stud sizes and gauges to accommodate lobbies and mechanical rooms. A 2-hr. fire-resistant rating, a common building code requirement, is met with USG Cavity Shaft Walls—UL Design No. U438 and U467. A 2-hr. fire-resistant assembly using one layer of SHEETROCK brand Gypsum Panels, ULTRACODE Core, is available—UL Design No. U492. A 2-hr. fire-resistant assembly using DUROCK Cement Board on the finish side is also available—UL Design U459. Up to 4-hour fire-resistance ratings and excellent sound control are offered with modified assemblies. Surface burning characteristics for 1" liner panels are flame spread 20, smoke developed 0. Many assembly details for doors and other penetrations of USG Cavity Shaft Walls have been tested for compliance with 2-hr. fire ratings.

Features

Faster Completion—Erected without adhesives for faster installation than other multi-layer gypsum panels systems.

Economical—Utilize low-cost materials and a minimum number of components.

Lightweight—Exceptionally low 9 psf for 2-hour systems to 16 psf for the 4-hour assembly.

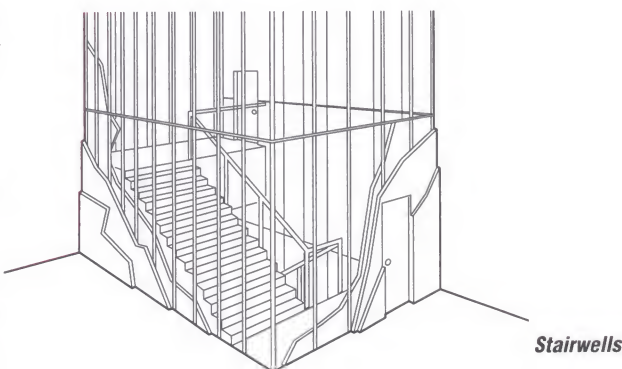
Sound Isolation—USG Cavity Shaft Wall System with 1" THERMAFIBER SAFB in cavity offers a 47 STC rating.

Airtight Seal—Application of SHEETROCK Acoustical Sealant minimizes whistling and dirt accumulation due to air movement in elevator shafts.

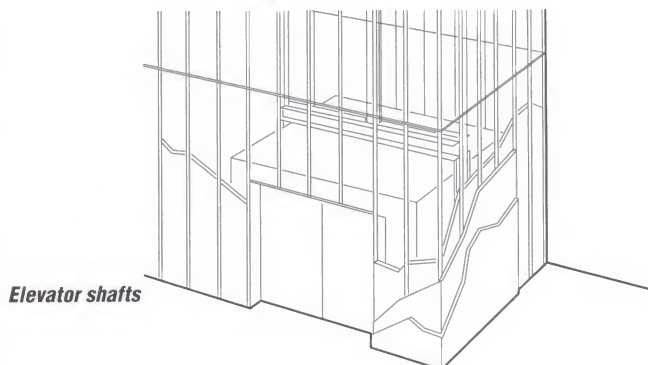
Flex-Resistant—Oscillation tests showed 24-ga. runners minimize flexing problems and are essential to safety over a long time period.

Limitations

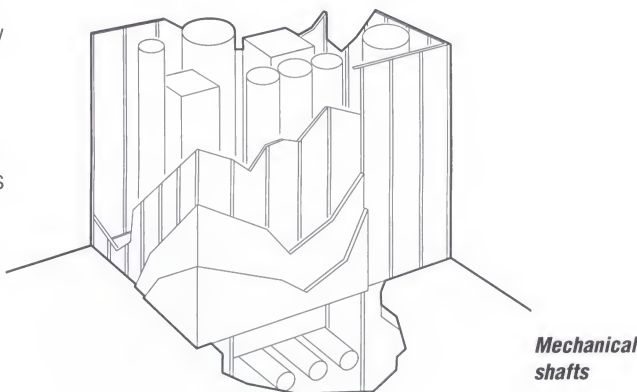
- 1 Non-load bearing.
- 2 Elevator door operating equipment must be independently mounted.
- 3 Exposure to excessive or continuous moisture and temperatures exceeding 125°F (52°C) must be avoided.



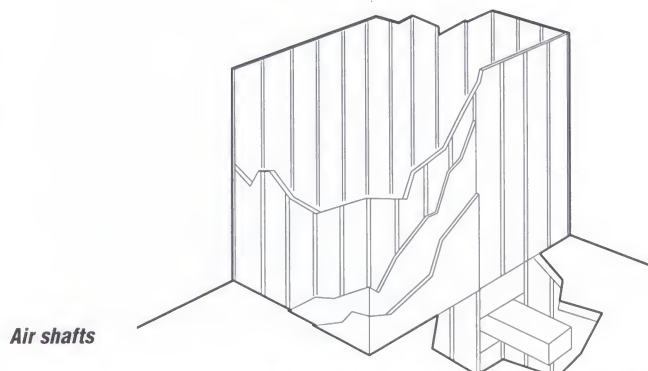
Stairwells



Elevator shafts



Mechanical shafts



Air shafts

Limiting Heights⁽¹⁾—Shaft Walls

Stud type & size	Designation	Stud spcg.	Allow. defl.	Intermittent air pressure load (wind load)—psf											
				2-hr. fire-rated system C, E, F, G, H (Page 36-37)				2-hr. fire rated system D ⁽²⁾ (Page 36)				1-hr. fire rated system A ⁽³⁾ (Page 36)			
				5	7.5	10	15	5	7.5	10	15	5	7.5	10	15
2½" C-H Studs	212CH25	24"	L/120	12'10"(f)	10'5"(f)	9'0"(f)	7'5"(f)	12'3"(d)	10'5"(f)	9'0"(d)*	6'0"(v)*	12'10"(f)	10'5"(f)	9'0"(f)*	7'5"(f)
			L/240	12'1"(d)	10'5"(f)	9'0"(f)	7'5"(f)	9'9"(d)	8'6"(d)	7'9"(d)*	6'0"(v)*	11'8"(d)	10'2"(d)	9'0"(d)	7'5"(f)
			L/360	10'7"(d)	9'3"(d)	8'5"(d)	7'4"(d)	8'6"(d)	7'5"(d)	6'9"(d)	5'11"(d)	10'2"(d)	8'11"(d)	8'0"(d)	7'1"(d)
	212CH22	24"	L/120	18'0"(f)	14'8"(f)	12'9"(f)	10'5"(f)	17'2"(d)	14'8"(f)	12'9"(f)	10'5"(f)	17'2"(d)	14'8"(f)	12'9"(f)	10'5"(f)
			L/240	14'11"(d)	13'0"(d)	11'10"(d)	10'4"(d)	13'7"(d)	11'11"(d)	10'10"(d)	9'5"(d)	13'7"(d)	11'11"(d)	10'10"(d)	9'5"(d)
			L/360	13'0"(d)	11'5"(d)	10'4"(d)	9'0"(d)	11'11"(d)	10'5"(d)	9'5"(d)	8'3"(d)	11'11"(d)	10'5"(d)	9'5"(d)	8'3"(d)
4" C-H Studs	400CH25	24"	L/120	16'11"(f)	13'10"(f)	11'11"(f)	9'8"(v)*	16'10"(f)	13'9"(f)*	10'4"(v)*	6'11"(v)*	16'10"(f)	13'9"(f)	10'4"(v)*	6'11"(v)*
			L/240	16'11"(f)	13'10"(f)	11'11"(f)	9'8"(v)*	16'3"(d)	13'9"(f)*	10'4"(v)*	6'11"(v)*	15'10"(d)	13'4"(d)	10'4"(v)*	6'11"(v)*
			L/360	14'3"(d)	12'5"(d)	11'11"(f)	9'8"(v)*	14'3"(d)	12'5"(d)	10'4"(v)	6'11"(v)*	13'4"(d)	11'8"(d)	10'4"(v)*	6'11"(v)*
	400CH20	24"	L/120	22'10"(d)	20'0"(d)	18'2"(d)	15'0"(f)*	23'7"(d)	20'7"(d)	18'5"(f)	15'0"(f)*	22'0"(d)	19'3"(d)	17'6"(d)*	15'0"(f)*
			L/240	18'2"(d)	15'10"(d)	14'5"(d)	12'7"(d)	18'9"(d)	16'4"(d)	14'10"(d)	13'0"(d)	17'6"(d)	15'10"(d)	13'4"(d)	12'2"(d)
			L/360	15'10"(d)	13'10"(d)	12'7"(d)	11'0"(d)	16'4"(d)	14'3"(d)	13'0"(d)	11'4"(d)	15'3"(d)	13'4"(d)	12'2"(d)	10'7"(d)*
6" C-H Studs	600CH20	24"	L/120	28'0"(c)	27'7"(d)	24'8"(f)*	18'0"(v)*	28'0"(c)	26'5"(d)*	24'0"(d)*	18'0"(v)*	28'0"(c)	26'8"(d)*	20'2"(v)*	13'6"(v)*
			L/240	25'1"(d)	21'11"(d)	19'11"(d)	17'5"(d)*	24'0"(d)	23'3"(d)	19'0"(d)	16'8"(d)*	24'3"(d)	21'2"(d)	19'3"(d)*	13'6"(v)*
			L/360	21'11"(d)	19'2"(d)	17'5"(d)	15'2"(d)	20'11"(d)	18'4"(d)	16'8"(d)	14'6"(d)	21'2"(d)	18'6"(d)	16'9"(d)*	13'6"(v)*
	600ES25	24"	L/120	28'0"(v)	18'9"(v)	14'0"(v)	9'3"(v)	28'0"(v)	18'9"(v)	14'0"(v)	9'3"(v)	28'0"(v)	18'9"(v)	14'0"(v)	9'3"(v)
			L/240	26'3"(d)	18'9"(v)	14'0"(v)	9'3"(v)	25'6"(d)	18'9"(v)	14'0"(v)	9'3"(v)	25'3"(d)	18'9"(v)	14'0"(v)	9'3"(v)
			L/360	23'0"(d)	18'9"(v)	14'0"(v)	9'3"(v)	22'3"(d)	18'9"(v)	14'0"(v)	9'3"(v)	22'0"(d)	18'9"(v)	14'0"(v)	9'3"(v)
Double 6" E-Studs	600ES25	24"	L/120	28'0"(c)	28'0"(c)*	28'0"(c)*	20'0"(v)*	28'0"(c)	28'0"(c)*	28'0"(c)*	20'0"(v)*	28'0"(c)	28'0"(c)*	28'0"(c)*	20'0"(v)*
			L/240	28'0"(c)	26'3"(d)*	24'0"(d)*	20'0"(v)*	28'0"(c)	28'0"(c)*	23'6"(d)*	20'0"(v)*	28'0"(c)	24'9"(d)	22'6"(d)*	20'0"(v)*
			L/360	26'3"(d)	23'0"(d)	21'0"(d)*	18'3"(d)*	26'3"(d)	22'9"(d)	20'6"(d)*	18'0"(d)*	25'3"(d)	21'9"(d)	19'6"(d)	17'3"(d)*
	600ES20	24"	L/120	28'0"(c)	28'0"(c)*	28'0"(c)*	20'0"(v)*	28'0"(c)	28'0"(c)*	28'0"(c)*	20'0"(v)*	28'0"(c)	28'0"(c)*	28'0"(c)*	20'0"(v)*
			L/240	28'0"(c)	26'3"(d)*	24'0"(d)*	20'0"(v)*	28'0"(c)	28'0"(c)*	23'6"(d)*	20'0"(v)*	28'0"(c)	24'9"(d)	22'6"(d)*	20'0"(v)*
			L/360	26'3"(d)	23'0"(d)	21'0"(d)*	18'3"(d)*	26'3"(d)	22'9"(d)	20'6"(d)*	18'0"(d)*	25'3"(d)	21'9"(d)	19'6"(d)	17'3"(d)*

(1) Table heights also apply to sustained pressures (max. 10 psf) equal to 1/2 of intermittent pressures shown. (2) For assembly with single-layer board both sides of studs. (3) For assembly with single-layer board attached to studs.

Limiting criteria: f—bending stress, d—deflection, v—end reaction shear, c—practical limitation. **IMPORTANT:** Runner fasteners should withstand 193 lb. single shear and 200 lb. bearing force; attachment spacing should not exceed 24" o.c.

*Use JR20 runner for heights with asterisk.

Limiting Heights

Maximum partition heights are shown for four different intermittent air pressure loads and three allowable deflections. The applied pressure load is selected by the designer based on elevator cab speed and the number of elevators per shaft. Instead of using only deflection criteria, United States Gypsum Company design data considers several additional factors in determining limiting partition heights.

A Bending stress—the unit force exerted which will make the stud yield.

B End reaction shear—determined by the amount of force applied to the stud which will bend or shear the J-runner, or cripple the stud.

C Deflection—the anticipated deflection under a load. Allowable deflection is based on the amount of bending under load that a particular wall can experience and still perform its function with safety.



Thickness—Steel components⁽¹⁾

Style	Design ⁽²⁾		Minimum	
	in	mm	in	mm
CH, ES 25	0.0188	0.48	0.0179	0.45
JR 24	0.0239	0.61	0.0227	0.58
CH 22	0.0310	0.79	0.0294	0.75
ES, JR, JS 20, CH 20	0.0359	0.91	0.0341	0.87

(1) Uncoated steel thickness; meets ASTM A568. Studs and runners meet ASTM C645. Base metal meets ASTM A446 standards for structural performance. Coatings are galvanized per ASTM A525; aluminumized per ASTM A463, or aluminum-zinc per ASTM A792. (2) Conforms to AISI Specification for the Design of Cold-Formed Steel Structural Members, 1986 edition.

Structural properties—Steel components

Component & size	Stud designation	Avg. weight (lb/lin ft)	Area (in ²)	I _x (in ⁴)	S _x (in ³)	Allow. design stress (ksi)
2½" C-H stud	212CH25	0.5186	0.1524	0.129	0.093	19.8
	212CH22	0.861	—	0.208	0.1519	24.0
	212CH20	0.998	—	0.239	0.1741	24.0
4" C-H stud	400CH25	0.6118	0.1798	0.383	0.162	19.8
	400CH20	1.243	—	0.730	0.318	24.0
6" C-H stud	600CH20	1.366	0.4227	1.998	0.569	24.0
Double 6" E-Stud	600ES25	1.546	0.3982	2.004	0.628	20.00
	600ES20	2.372	0.0840	3.400	1.094	20.00
2½" J-Runner	212JR24	0.448	—	0.117	0.085	3.00
	212JR20	0.670	—	0.192	0.130	4.96
4" J-Runner	400JR24	0.573	—	0.351	0.163	3.00
	400JR20	0.857	—	0.574	0.251	4.96
6" J-Runner	600JR24	0.740	—	0.937	0.295	3.00
	600JR20	1.107	—	1.523	0.457	4.96
2½" Jamb Strut	212JS20	0.818	—	0.226	0.143	3.00
4" Jamb Strut	400JS20	1.006	—	0.647	0.270	3.00
6" Jamb Strut	600JS20	1.256	—	1.673	0.485	3.00

*Full section modulus to be used with corresponding design stress. For wind loads, design stress shown can be increased 33%.

Elevator Shaft Pressures

The air pressure load on shaft walls depends upon the elevator cab speed and the number of elevators per shaft. The following recommendations are derived from United States Gypsum Company tests conducted in three high-rise buildings up to 100 stories.

Design elevator pressure load

Elevator velocity ft./min.	One or two elevators per shaft	Three or more elevators per shaft
0 to 180	5.0 psf	5.0 psf
180 to 1,000	7.5 psf	5.0 psf
1,000 to 1,800	10.0 psf	7.5 psf
1,800 to 3,000	15.0 psf	7.5 psf

Elevator Door and Frame Assemblies

Typically, for buildings of four stories or more, building codes require a 1½-hour "B" rating for elevator entranceways in a 2-hour rated shaft wall. Certain firms have conducted fire tests with their door and frame assemblies in USG Cavity Shaft Walls—UL Design U438 rated 2 hours. These door assemblies comply with the safety code for elevators and dumbwaiters ANSI A17.1 and have been tested per ASTM E152. When specifying door frame assemblies, also specify installation in the shaft wall in which assemblies were performance tested.

There have been many successful UL tests on door assemblies in USG Cavity Shaft Walls, some are shown below.

Shaft wall entranceway assemblies—1½-hr. fire rated

Manufacturer	Maximum opening size	Door type	UL file no.
Otis	42"x84"	center opening	R7416
Otis	48"x100½"	two-speed slide	R7416
Otis	48"x102"	center opening	R7416
Westinghouse	48"x102"	center opening	R8176
Dover	42"x96"	single slide	R6155
Dover	48"x96"	center opening	R6155
Tyler	42"x102"	single slide	R6403
Tyler	60"x108"	center opening	R6403
D A Matot	48"x78"	dumbwaiter	R6748
Hauenstein & Burmeister	48"x108"	center opening	R4153
Courion Industries	48"x84"	dumbwaiter	R2317
General Elevator	48"x84"	center opening	R10483
Columbia	42"x108"	single slide	R9642
Columbia	48"x108"	center opening	R9642

Note: Entranceways tested with UL Design U438 shaft wall and achieved a 1½-hour "B" rating. Apparent duplications are a result of tests involving different types or styles of either frames or doors.

Air Handling Systems

Gypsum shaft walls have been used for many years to house all types of ducts in the shaft area. Their fire-resistant features plus economical dry construction make them ideal for this use. Today shaft walls are used successfully without a metal liner for handling return air in HVAC systems. To function properly, shaft wall systems should be designed with the following performance provisions.

- 1 Gypsum board surface temperature does not exceed 125°F.
- 2 Air stream dew point temperatures are maintained below gypsum board surface temperature.
- 3 The assembly is constructed to withstand sustained design uniform air pressure loads not exceeding 10 psf. Start up surge loads should not be greater than 1½ times the design static load.
- 4 Separate approved liners should be installed in areas subject to continuous moisture overspray, condensation or air stream temperature over 125°F.
- 5 To ensure airtight construction, select appropriate sealants and apply where required.

Limiting heights—Unlined return air shafts

Stud type & size	Designation	Stud spec.	Allow. defl.	Sustained pressure load—psf			
				2-hr. fire-rated system		1-hr. fire rated system	
				5	10	5	10
2½" C-H Studs	212CH25	24"	L/120	10'5"	7'5"	10'5"	6'0"
			L/240	10'5"	7'5"	8'6"	6'0"
			L/360	9'3"	7'5"	7'5"	5'11"
	212CH22	24"	L/120	14'8"	10'5"	10'5"	10'5"
			L/240	13'0"	10'4"	11'11"	9'5"
			L/360	11'5"	9'0"	10'5"	8'3"
4" CH Studs	212CH20	24"	L/120	15'9"	11'2"	14'8"	11'2"
			L/240	13'4"	10'7"	12'2"	9'8"
			L/360	11'7"	9'3"	10'8"	8'3"
	400CH25	24"	L/120	13'10"	9'8"	13'9"	6'11"
			L/240	13'10"	9'8"	13'4"	6'11"
			L/360	12'5"	9'8"	11'8"	6'11"
6" C-H Studs	400CH20	24"	L/120	20'0"	15'0"	19'3"	15'0"
			L/240	15'10"	12'7"	15'3"	12'2"
			L/360	13'10"	11'0"	13'4"	10'7"
	600CH20	24"	L/120	27'7"	18'0"	26'8"	13'6"
			L/240	21'11"	17'5"	21'2"	13'6"
			L/360	19'2"	15'2"	18'6"	13'6"
Double 6" E-Studs	600ES25	24"	L/120	18'9"	9'3"	18'9"	9'3"
			L/240	18'9"	9'3"	18'9"	9'3"
			L/360	18'9"	9'3"	18'9"	9'3"
	600ES20	24"	L/120	28'0"	20'0"	28'0"	20'0"
			L/240	26'3"	20'0"	24'9"	20'0"
			L/360	23'0"	18'3"	21'9"	17'3"

Important: Runner fasteners should withstand 193 lb. single shear and 200 lb. bearing force; attachment spacing should not exceed 24" o.c.

*Use JR20 runner for heights with asterisk.

Horizontal Shaft Wall Assemblies

USG Cavity Shaft Walls installed horizontally provide economical construction for fire-resistive duct protection, corridor and other ceilings and stairway soffits. Also ideal for ceilings over office areas in pitched-roof buildings and in modular buildings where ceiling framing is independent of the floor above. With 1" liner panels inserted in C-H studs 24" o.c. and triple-layer ½" SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw-attached to studs, the system provides greater spans and 2-hr. protection from fire either inside or outside the duct. Test No.: WHI-415PSH 0154/0167.

With double-layer ½" SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw-attached to studs, the assembly provides suitable 2-hour fire-resistive ceiling construction for corridors and stairs.

One-hour fire-rated construction is offered with single-layer ½" SHEETROCK brand Gypsum Panels, FIRECODE C Core.

Limiting span—Horizontal shaft walls⁽¹⁾

Stud style	Single-layer ½" gypsum panels ⁽²⁾	Double-layer ½" gypsum panels ⁽²⁾	Triple-layer ½" gypsum panels ⁽²⁾
212CH25	6'7"	6'0"	6'5"
212CH22	9'4"	8'6"	7'11"
212CH20	10'3"	9'2"	8'3"
400CH25	8'8"	7'10"	8'6"
400CH20	14'6"	13'2"	12'0"
600CH20	17'5"	15'10"	13'8"

(1) Based on L/240 allowable deflection and JR24 runner. (2) Allowable steel stress reduced 50%.

(3) Full steel stress allowed based on ASTM E119.



No other drywall shaft assembly provides such an economical horizontal application

Area Separation Fire Wall/Party Wall

These lightweight non-load bearing gypsum drywall assemblies are designed as vertical fire barriers for fire walls and party walls separating occupancies in wood-frame apartments and townhouses. They are the essence of simplicity—large-size gypsum panels attached to steel studs and runners quickly become thin, space-saving walls offering remarkable acoustical privacy. Their engineered performance and low labor and material costs make these systems superior to masonry construction.

These systems may be used in buildings up to four stories high and with all common floor-ceiling heights found in multi-family housing. Both cavity and solid types are suitable for exterior walls with appropriate weather-resistant facing when building offsets are desired; also for use with flat wood decks.

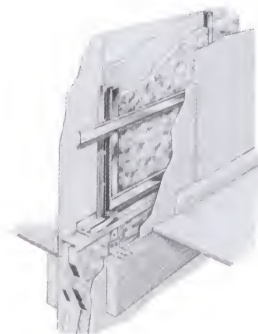
Solid-Type Area Separation Wall—Basic 2-hour fire-resistant assembly (UL Design U336) consists of two 1" thick SHEETROCK brand Gypsum Liner Panels installed vertically between 2" USG Steel CR-Runners. Panel edges are inserted in 2" USG Steel H-Studs spaced 24" o.c. USG Steel CR-Runners are installed at top and bottom of wall and back-to-back between vertical panels cut to a convenient length above each intermediate floor. A $\frac{3}{4}$ " min. air space must be maintained on both sides separating 2" solid-type assembly from any adjacent construction. Steel H-studs are attached to wood framing at intermediate floors with 0.063" USG aluminum angle clips 10' o.c. which break away when exposed to fire, thus permitting a fire-damaged structure to fail while the fire barrier remains intact.

With 25-ga. steel H-studs, the assemblies are suitable for floor-to-ceiling heights (i.e., between clip angle supports) up to 10' under 5-psf lateral load and up to 8' as an exterior wall under 15-psf wind load without exceeding L/240 allowable deflection.

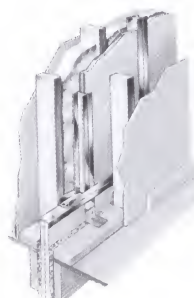
With 2" THERMAFIBER SAFB stapled to each side of liner panels, the assembly has obtained a 3-hr. fire resistance rating allowing separate selection and construction of tenant walls.

Based on the location in the building the area separation wall can be varied to provide the framing and finish desired. Consult local code for limiting criteria.

Cavity-Type Area Separation Wall—USG Steel C-H Studs and gypsum liner panels set in steel runners and faced both sides with SHEETROCK brand Gypsum Panels, Water-Resistant, FIRECODE C Core. Gypsum liner panels, 1" thick, are erected vertically with ends set into 2 $\frac{1}{2}$ " USG Steel CR-Runners and edges inserted into specially formed 2 $\frac{1}{2}$ " USG Steel C-H Studs. USG Steel CR-Runners are installed singly at top and bottom of wall and back-to-back between vertical liner panels on a line above each intermediate floor. Aluminum clips, which attach the studs to adjacent wood framing, break away in the same fashion as with solid-type walls. To improve sound transmission loss, THERMAFIBER SAFB are inserted in the stud cavity and RC-1 Resilient Channels may be used to isolate the face layer.



Cavity-type



Solid-type

With 212CH25 steel studs spaced 24" o.c., the systems are suitable for floor-to-ceiling heights up to 10' under 5-psf lateral load and up to 8' as exterior walls under 15-psf wind load without exceeding L/240 deflection. For buildings over 23' in height, use 400CH20 studs on the lower floors below the top 23' of the building.

Components used in these systems are designed to permit temporary exposure to inclement weather during construction. The USG Aluminum Breakaway Clip is covered by U.S. Patent No. 3,974,607.

Features

Fire Resistance—Both types of Separation Wall offer 2-hr. and 3-hr. fire ratings.

Sound Isolation—STC ratings up to 60 with the solid wall system and 57 with the cavity system are available.

Lightweight—These drywall assemblies weigh at least 50% less than masonry walls. This fact speeds installation.

Space-Saving—Use of these assemblies gains valuable floor space. Thickness is 3 $\frac{1}{2}$ " to 4" for Cavity Type Walls, compared to 8" to 12" for a masonry wall without interior finish.

Weather Resistance—Moisture-resistant components permit installation in any weather—eliminate many costly winter construction delays.

Code Compliance—In compliance with fire resistance requirements under evaluation reports of BOCA Report No. 87-63 and SBCCI Report No. 9137.

Limitations

- 1 Non-load bearing.
- 2 Maximum frame spacing: 24".
- 3 Not recommended for shear walls.
- 4 Maximum building height: 44'.



a.



c.



b.

a. USG Steel H-Stud slides in place over SHEETROCK brand Gypsum Liner Panel.
b. USG Steel CR-Runner fits over studs and panels. Second runner is then screw-attached back-to-back to lower runner to hold next level of studs and liner panels.
c. USG Aluminum Breakaway Clip is screw-attached to studs and framing. Under fire exposure, clip breaks away, permits fire-damaged wall to fall, leaving separation wall intact.

High Performance Sound Control Systems

Horizontal RC-1 Resilient Channels are screw-attached 24" o.c. to the narrow flange side of SJ steel studs which also are spaced 24" o.c. SHEETROCK brand Gypsum Panels, FIRECODE C Core, are screw-attached directly to the studs on one side and to the resilient channels on the other side. THERMAFIBER SAFB are friction-fitted in the partition cavity. The SAFB are pressed against the direct-applied gypsum panel, leaving a minimum 1/2" space between the resilient channel and the SAFB. All resilient channels are installed with mounting flange down. SHEETROCK Acoustical Sealant is applied between the gypsum panel and the floor. SHEETROCK Acoustical Sealant is also used where a resilient channel mounted gypsum panel intersects a wall plane that is not resilient channel mounted, where a gypsum panel meets a dissimilar material, where outlets and other penetrations need to be sealed, and where expansion or other joints need to be sealed to help prevent cracking.

Features

Versatile—Partition can be designed to meet a specific requirement. Or a single-layer design which meets an acoustic code requirement can be easily and economically upgraded, for example, party walls in apartments or condos.

Fire Resistant—Constructed of noncombustible components, up to 3-hr. fire ratings are available.

Sound Isolating—Efficient sound insulation at all frequencies. The multilayer designs provide exceptional isolation at low, mid and high frequencies making them ideal for isolating loud music, mechanical equipment and amplified speech sound sources.

Lightweight, Thin—Allows for the most efficient use of materials and space to meet the needs of a specific project. Structural systems provide means for high acoustic performance, double construction with tall, relatively thin, lightweight partitions.

Economical and Convenient—Low cost, readily available materials install simply and easily; provide highly competitive costs and superior value for the performance offered.

Limitations

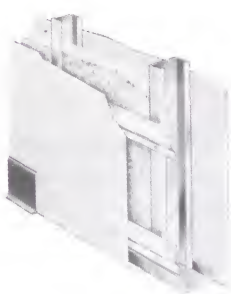
- 1 Exposure to excessive or continuous moisture and extreme temperatures should be avoided.
- 2 The fire resistance ratings and exceptionally high sound ratings are predicated upon use of identical components and installation procedures. This includes proper application of SHEETROCK Acoustical Sealant and installation of THERMAFIBER SAFB spaced away from the resilient channels.
- 3 Maximum stud spacing: 24"; maximum resilient channel spacing: 24". Ceramic tile is not recommended for application to single layer panels or on the resilient channel side.
- 4 Variable wind pressure can cause a high-rise building to drift or sway. This can result in movement of the non-load bearing partitions, thus causing noise. United States Gypsum Company assumes no responsibility for the prevention, cause or repair of this job-related noise.

Typical Limiting Heights⁽¹⁾

Stud designation ⁽²⁾	Stud width	Stud gauge	Wind load/deflection					
			5 psf		10 psf		15 psf	
			L/240	L/360	L/240	L/360	L/240	L/360
362SJ20	3 1/2"	20	14'9"	13'0"	11'9"	10'3"	10'3"	9'0"
362SJ18		18	16'3"	14'3"	13'0"	11'3"	11'3"	10'0"
362SJ16		16	17'6"	15'3"	14'0"	12'3"	12'3"	10'9"
362SJ14		14	18'9"	16'6"	15'0"	13'3"	13'3"	11'6"
40SJ20	4"	20	15'9"	14'0"	12'9"	11'3"	11'3"	9'9"
40SJ18		18	17'3"	15'3"	14'0"	12'3"	12'3"	10'9"
40SJ16		16	18'9"	16'6"	15'0"	13'3"	13'3"	11'6"
40SJ14		14	20'0"	17'9"	16'3"	14'3"	14'3"	12'6"
60SJ20	6"	20	22'0"	19'3"	17'9"	15'6"	15'6"	13'6"
60SJ18		18	24'0"	21'3"	19'3"	17'0"	17'0"	14'9"
60SJ16		16	26'0"	23'0"	21'0"	18'6"	18'6"	16'0"
60SJ14		14	28'0"	24'9"	22'6"	19'9"	19'9"	17'3"
80SJ18	8"	18	30'6"	26'9"	24'6"	21'6"	21'6"	18'9"
80SJ16		16	33'0"	29'3"	26'6"	23'3"	23'3"	20'6"
80SJ14		14	35'6"	31'3"	28'6"	25'0"	25'0"	22'0"

(1) Refer to Typical Physical and Structural Properties on page 13.

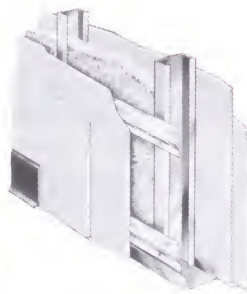
(2) Studs 24" o.c.



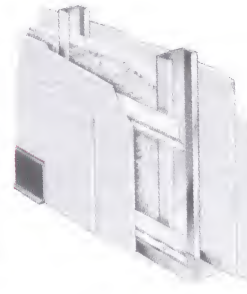
UL Des. U451
56 STC, 48 MTC



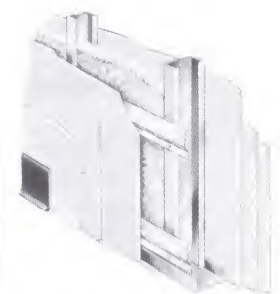
UL Des. U453
58 STC, 52 MTC



UL Des. U454
63 STC, 59 MTC



UL Des. U455
64 STC, 59 MTC



UL Des. U455
63 STC, 58 MTC

Metric Conversion in the Construction Industry

The federal government segment of the construction industry is in the midst of changing to metric measurement and the coming changes will have an impact on U.S. Gypsum Company products.

Metric is Part of Federal Procurement

In 1988 federal law mandated the metric system as the preferred system of measurement in the United States, and required that metric measurement be used in all federal procurement, to the extent feasible, by September 30, 1992. The intent of this conversion is to make the United States more competitive in a global market that is now virtually all metric.

In July, 1990, President George Bush signed executive order 12770, *Metric Usage in Federal Government Programs*, which required all agencies to establish milestones and timetables for conversion. Most agencies have agreed to require that all plans and specifications for government projects be metric effective January 1, 1994.

What Is Changing?

Many of the building materials, systems and documents used in federal projects will be affected by the change to metric.

Drawings—Units are changing from feet and inches to millimeters, scales are changing from inch fractions to feet (for example, $\frac{1}{4}"=1'0"$) to true ratios (such as 1:20). Drawings are not to be dual dimensioned, in order to avoid dimensional conflicts and errors.

Specifications—Specs will call for metric linear dimensions, areas, and volumes.

Construction Products—A majority of construction products won't change in size since they are not modular or panelized. They will simply be "soft converted" or re-labeled in metric dimensions.

Framing—Stud spacing is changing from 16" to 400 mm and 24" to 600 mm. Wood studs likely will keep their nominal name, or may be re-labeled a nominal 50 mm x 100 mm or a more exact size.

Drywall, Plywood, and Rigid Insulation—Width is changing from 4'0" to 1200 mm. Length is changing from 8'0" to 2400 mm, 10'0" to 3000 mm. Actual product thickness will not change since it would affect fire, sound, and thermal ratings of assemblies.

Batt Insulation—Width is changing from 16" and 24" nominal to 400 mm and 600 mm nominal, or no change—just more of a friction fit.

Ceiling Systems—Grids and lay-in ceiling tile, air diffusers and lighting fixtures, from 2'x2' to 600 mm x 600 mm and from 2'x4' to 600 mm x 1200 mm. Grid profiles, tile thicknesses, air diffuser capacities and fluorescent tubes will not change.

Raised Floor Systems—Changing from 2'x2' to 600 mm x 600 mm. Support systems will not change.

U. S. Gypsum Company Metric Policy

U. S. Gypsum Company supports the intent of the metric conversion program. We have manufactured metric size products for export for many years on a special order basis. Our company will make every reasonable effort to make metric products available to the federal market on a special order basis. Metric width and length SHEETROCK brand Gypsum Panel products will be available from designated manufacturing plants throughout the United States. Metric length DUROCK Cement Board products will also be available from designated manufacturing plants. Certain minimum order quantities and up-charges may apply, as determined by local market conditions.

Our bag and pail products, including SHEETROCK joint treatment products, spray textures, gypsum plasters and other products already carry soft metric designations for size and/or weight.

Important: Our basic product line will remain unchanged—standard foot/inch/pound products previously available from U.S. Gypsum Company will still be readily available. The addition of metric length/width products will allow us to supply all job requirements, whether standard or metric.

U.S. Gypsum Company will offer assistance to construction professionals with regard to design, specification and installation issues involving our metric products, just as we always have with our standard products.

Metric Changes—Board Dimensions

Current Dimension	New Metric Dimension
8 ft. (2438.4 mm)	2400 mm (94.49 in.)
9 ft. (2743.2 mm)	2700 mm (106.3 in.)
10 ft. (3048.0 mm)	3000 mm (118.11 in.)
12 ft. (3657.6 mm)	3600 mm (141.73 in.)

Metric Changes—Board Thickness*

Current Dimension	New Metric Product Designation	Nominal Dimension
$\frac{1}{4}$ in.	6.4 mm	6 mm
$\frac{5}{16}$ in.	8.0 mm	8 mm
$\frac{3}{8}$ in.	9.5 mm	10 mm
$\frac{1}{2}$ in.	12.7 mm	13 mm
$\frac{5}{8}$ in.	15.9 mm	16 mm
$\frac{3}{4}$ in.	19.1 mm	19 mm
1 in.	25.4 mm	25 mm

*As noted above, thickness of board products will not change.

Metric dimension board will carry new soft conversion thickness designations. However, not all thickness designations and end tapes will change immediately.

Metric Changes—Board Installation Dimensions

Current Dimension	New Metric Dimension
12 in. (304.8 mm)	300 mm (11 $\frac{13}{16}$ in.)
16 in. (406.4 mm)	400 mm (15 $\frac{7}{8}$ in.)
24 in. (609.6 mm)	600 mm (23 $\frac{1}{2}$ in.)
48 in. (1219.2 mm)	1200 mm (47 $\frac{1}{4}$ in.)

For Information and Assistance

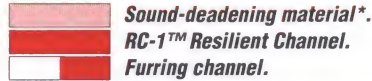
Check our current printed literature for more information on product sizing and availability. Information on specific metric product availability in your market area may be obtained from a U. S. Gypsum Company sales or customer service representatives. They can be reached at local sales offices or order centers. This literature contains a list of U. S. Gypsum Company sales offices throughout the country. More information on this conversion process will be available in the coming months.

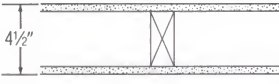
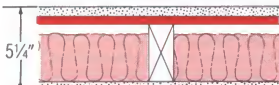

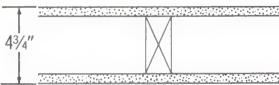
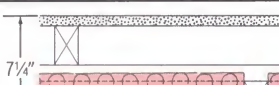
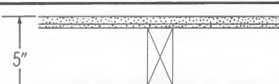


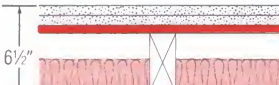
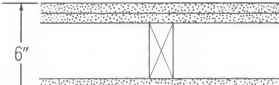
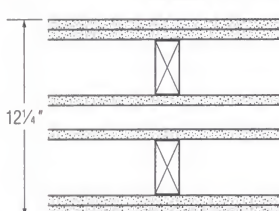
U. S. Gypsum Company Area Technical Marketing Managers are familiar with the metric changes and may be contacted for assistance with product design or selection information. Contact them through local or area sales offices. Product literature requests can be handled by calling 1-800-USG-4YOU (1-800-874-4968).

Questions regarding products such as ceilings, demountable walls, raised access floors, and mineral wool insulation should be directed to USG Interiors, Inc. Export inquiries should be directed through the main switchboard number above to USG International, Ltd.

Construction System Selector

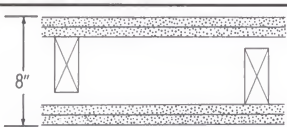
Wood Framed Partitions




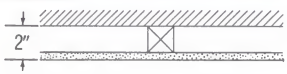
Fire rating	Fire-rated construction		Acoustical performance		System reference
	Detail & physical data	Description & test no.	STC	Description & test no.	
45 min.	 wt.. 6	Wd Stud— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core—2x4 16" o.c.—panels nailed 7" o.c.—1 $\frac{1}{2}$ " cem ctd nails—joints exp or fin— UL Des U317	N/A		A
1 hr.	 wt.. 7	Wd Stud—resil partition— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core—2x4 16" or 24" o.c.—3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c.—panels att with 1" Type S screws—opp side direct att with 1 $\frac{1}{2}$ " Type W screws—end joints back-blocked with RC-1 chan—joints fin—perimeter caulked— UL Des U311	50	BBN-760903	B
1 hr.	 wt.. 7	Wd Stud—resil partition— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE core—2x4 16" o.c.—RC-1 chan both sides spaced horiz 24" o.c.—panels att with 1" Type S screws—joints fin—perimeter caulked— T-1396-OSU	41	Based on RC-1 chan one side only— USG 860802	C
1 hr.	 wt.. 7	Wd Stud— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, water-resistant, FIRECODE core—2x4 16" or 24" o.c.—panels nailed 7" o.c.—1 $\frac{1}{2}$ " cem ctd nails—joints exp or fin—perim caulked— UL Des U305 based on 16" stud spacing— UL Des U314 based on 24" stud spacing, joints fin	34 37 46	Based on 16" stud spacing and screws 6" o.c.— USG-30-FT-G&H Based on 24" stud spacing— USG-860807 Based on 24" stud spacing & 3" SAFB— BBN 700725	D
1 hr. est	 wt.. 8	Stag Wd Stud— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE core—2x3 non-load bearing studs 16" o.c.—2x3 plates 1" apart—panels nailed 7" o.c.—3" THERMAFIBER SAFB one side—joints fin—perim caulked—est. fire rating based on UL Des U305	54	Based on screws or nails 7" o.c.— TL-77-149	E
1 hr. est	 wt.. 8	Wd Stud—2 layer—base layer $\frac{1}{2}$ " SHEETROCK brand gypsum panels appl vert with 4d ctd nails— $\frac{1}{2}$ " panel face layer strip lamin plus 6d nails 6" o.c. top & bottom plates— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core—2x4 16" o.c.—joints stag & fin—perimeter caulked— GA-WP 3341	45 53	TL-69-52 Based on $\frac{3}{8}$ " lamin, face layers & 1 $\frac{1}{2}$ " SAFB— USG-221-ST-G&H	F
1 hr.	 wt.. 8	Stag Wd Stud— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core—2x4 16" o.c. on 2x6 com plate—panels att with 6d ctd nails or 1 $\frac{1}{2}$ " screws 7" o.c.—perim caulked—joints fin— UL Des U340	45	Based on FIRECODE core panels— TL-69-213	G
1 hr. est	 wt. 12	Wd Stud—2 layers $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core, ea side—2x4 16" o.c.—3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c.—resil side screw att—opp side nail att—both base layers appl vert and face layers appl horiz—base layers perim caulked—joints fin— UL Des U334	59 49	TL-67-239 Based on same construction without SAFB— TL-67-212	H
2 hr.	 wt. 13	Wd Stud—2 layers $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core, ea side—2x4 16" o.c.—2" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c.—resil side screw att—opp side nail att—both base layers appl vert and face layers appl horiz—resil layers perim caulked—joints fin— T-4799-OSU	58 52	USG-810219 Based on same assembly (non-rated) without SAFB— USG-810218	I
2 hr.	 wt. 12	Wd Stud—2 layers $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE core or SHEETROCK brand gypsum panels, water-resistant, FIRECODE core, ea side—2x4 16" o.c.—base layer att with 1 $\frac{1}{2}$ " nails 6" o.c.—face layer att with 2 $\frac{3}{8}$ " nails 8" o.c.—joints exp or fin— UL Des U301	N/A		J
2 hr.	 wt. 13	Wd Stud—2 layers $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE core outside, both sides— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE core, inside, both sides—2 rows 2x4 24" o.c.—base layer att with 6d ctd nails 6" o.c.—face layer att with 8d ctd nails 8" o.c.—perim caulked—joints fin— UL Des U342	51 56	TL-69-214 Based on 3 $\frac{1}{2}$ " thick insulation in one cavity— USG-710120	K

*Where thermal insulation is shown in assembly drawings, the specific product is required in the assembly to achieve the stated fire rating. Fiberglass insulation can not be substituted for THERMAFIBER Insulation.

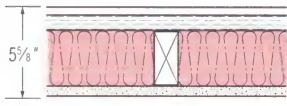
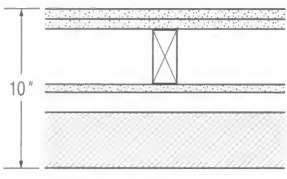
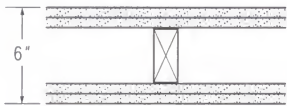
Wood Framed Partitions

Fire rating	Fire-rated construction		Acoustical performance		System reference
	Detail & physical data	Description & test no.	STC	Description & test no.	
2 hr. est	 wt. 13	Stag Wd Stud—2 layers 5/8" SHEETROCK brand gypsum panels, FIRECODE C core—2x4 16" o.c. on 2x6 com plate—base layer att with 6d ctd nails 24" o.c.—face layer att with 8d ctd nails 8" o.c.—stagger vert joints 16" o.c.—perim caulked—joints fin—GA-WP 3910	47	Based on FIRECODE core panels—TL-69-211	L

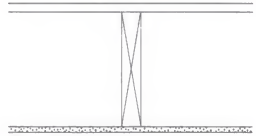
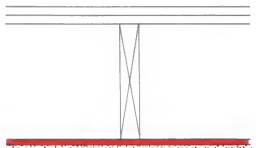
Wood Framed Wall Furring

Detail & physical data		Description	Comments	System reference
		SHEETROCK Z-furring channels 24" o.c.—THERMAFIBER fire safety FS-15 blankets between channels—5/8" SHEETROCK brand gypsum panels, foil-back, screw attached—joints finished	System suitable for up to 3" thick insulation; good vapor retarder, no limiting height	M
		Wood furring strips 16" o.c.—1/2" SHEETROCK brand gypsum panels, foil-back—joints finished	Surface not isolated from structural stresses	N

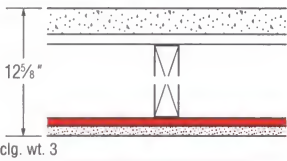
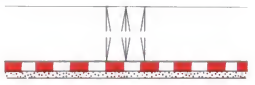
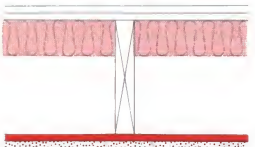
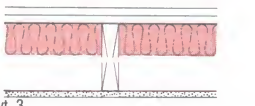
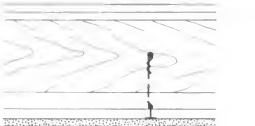
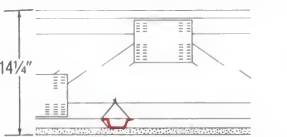
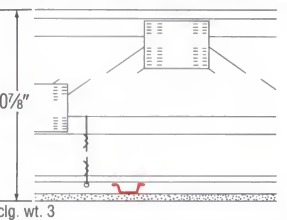
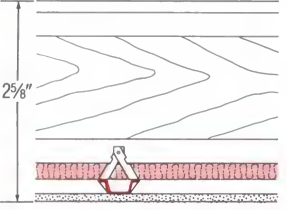
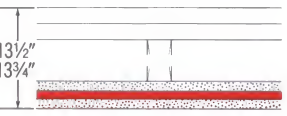
Wood Framed Exterior Walls

Fire rating	Fire-rated construction		Acoustical performance		System reference
	Detail & physical data	Description & test no.	STC	Description & test no.	
1 hr.		Wd Stud—5/8" SHEETROCK brand gypsum panels, FIRECODE C core, interior—1" foamed plastic and 1/2" plywd siding—2x4 16" o.c.—3/4" THERMAFIBER fire safety FS-15 blankets—foamed plastic att with 1 1/2" galv nails, plywd siding att with 10d galv nails 12" o.c.—gypsum panels appl vert with 6d cem ctd nails 7 1/2" o.c.—joints fin—UL Des U330		Rating applicable to fire exposure on interior face only.	O
2 hr		Wd Stud—2 layers 5/8" SHEETROCK brand gypsum panels, FIRECODE core, interior—1/2" gypsum sheathing and 4" brick masonry veneer exterior—2x4 16" o.c.—sheathing appl horiz with 11d galv nails 6" o.c.—gypsum panels appl horiz or vert with nails 8" o.c.—joints stag & fin—UL Des U302			P
2 hr.		Wd Stud—2 layers 5/8" SHEETROCK brand gypsum panels, FIRECODE core, interior—2 layers 1/2" gypsum sheathing, FIRECODE core, exterior—2x4 16" o.c.—base layer att with 1 1/2" nails 6" o.c.—face layer att with 2 3/4" nails 8" o.c.—joints—exp or fin—UL Des U301			Q

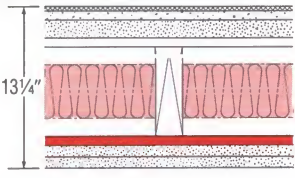
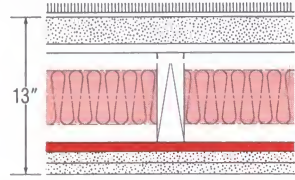
Wood Framed Ceilings

Fire rating	Fire-rated construction		Acoustical performance		System reference
	Detail & physical data	Description & test no.	STC	IIC	
1 hr.	 clg. wt. 3	5/8" SHEETROCK brand gypsum panels, FIRECODE core, ceiling—1" nom wd sub & fin flr—2 x 10 wd joist 16" o.c.—panels att with 6d nails 6" o.c.—joints fin—UL Des L501	38	32	CK-6412-7
		1/2" or 5/8" SHEETROCK brand gypsum panels, FIRECODE C core, ceiling—1" nom wd sub & fin flr—2 x 10 wd joist 16" o.c.—panels att with 5d cem ctd nails 6" o.c.—joints fin—UL Des L512	N/A	56	Based on 44-oz carpet & 40-oz pad atop flooring—CK-6412-8
1 hr.	 wt. 3	Resil ceiling—5/8" or 3/4" SHEETROCK brand gypsum panels, FIRECODE C core—1 1/2" nom wd sub & fin flr—2 x 10 wd joist 16" o.c.—RC-1 chan spaced 24" o.c.—panels att with 1" Type S screws—end joints back-blocked with RC-1 chan—joints fin—UL Des L514	N/A		C
		Resil ceiling—5/8" or 3/4" SHEETROCK brand gypsum panels, FIRECODE core—1 1/2" nom wd sub & fin flr—2x10 wd joist 16" o.c.—RC-1 chan screw att to joists—panels att with 1" Type S screws—joints fin—est. fire rating based on UL Des L514	47	39	Based on 5/8" SHEETROCK brand gypsum panels, FIRECODE C core—CK-6512-6
			47	39	Based on 5/8" SHEETROCK brand gypsum panels, FIRECODE core—CK-6412-10
		Resil ceiling—5/8" or 3/4" SHEETROCK brand gypsum panels, FIRECODE core—1 1/2" nom wd sub & fin flr—2 x 10 wd joist 16" o.c.—RC-1 chan screw att to joists—panels att with 1" Type S screws—end joints back blocked with RC-1 chan—joints fin—est. fire rating based on UL Des L514	47	67	Based on 5/8" SHEETROCK brand gypsum panels, FIRECODE C core—CK-6512-7
			48	66	Based on 5/8" SHEETROCK brand gypsum panels, FIRECODE core—CK-6412-9

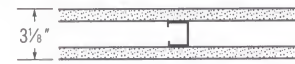








Wood Framed Ceilings

Fire rating	Fire-rated construction		Acoustical performance				System reference
	Detail & physical data	Description & test no.	STC	NC	Description & test no.		
1 hr.		Resil ceiling— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core— $1\frac{1}{2}$ " perlite-sand conc over $\frac{3}{4}$ " plywd sub-floor—2 x 10 wd joist 16" o.c.—RC-1 chan spaced 24" o.c.—panels att with 1" Type S screws—end joints back-blocked with RC-1 chan—joints fin— UL Des L516	59		Based on $\frac{3}{8}$ " gypsum concrete and $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core— USG 740704		F
	clg. wt. 3			47	Based on vinyl tile atop flooring— USG 740703		
				65	Based on 44-oz. carpet & 40-oz. pad atop flooring— USG 740705		
1 hr.		$\frac{3}{8}$ " SHEETROCK brand gypsum panels, FIRECODE core, ceiling—double 2 x 10 or single 4 x 10 wd joist 48" o.c.—met fur chan spaced 24" o.c.—panels att with 1" Type S screws—joints fin— UL Des L508	N/A				G
1 hr. est		Resil ceiling—SHEETROCK brand gypsum panels, FIRECODE core— $1\frac{1}{2}$ " nom wd sub & fin flr—2x10 wd joist 16" o.c.—3" THERMAFIBER SAFB betw joists—RC-1 screw att to joists—panels att with 1" Type S screws—end joints back-blocked with RC-1 chan—joints fin—est. fire rating based on UL Des L514	51	46	Based on $\frac{3}{8}$ " SHEETROCK brand gypsum panels, FIRECODE C core— CK-6512-9		H
	clg. wt. 3		50	46	Based on $\frac{3}{8}$ " SHEETROCK brand gypsum panels, FIRECODE core— CK-6412-3		
		Resil ceiling—SHEETROCK brand gypsum panels, FIRECODE core— $1\frac{1}{2}$ " nom wd sub & fin flr—44-oz carpet & 40-oz pad atop flr—2 x 10 wd joist 16" o.c.—3" THERMAFIBER SAFB betw joists—RC-1 chan screw att to joists—panels att with 1" Type S screws—end joints back-blocked with RC-1 chan—joints fin—est. fire rating based on UL Des L514	52	71	Based on $\frac{3}{8}$ " SHEETROCK brand gypsum panels, FIRECODE C core— CK-6512-8		I
			51	70	Based on $\frac{3}{8}$ " SHEETROCK brand gypsum panels, FIRECODE core— CK-6412-4		
1 hr. est		$\frac{3}{8}$ " SHEETROCK brand gypsum panels, FIRECODE core, ceiling—1" nom wd sub & fin flr—2x10 wd joist 16" o.c.—3" THERMAFIBER SAFB betw joists—panels att with 6d nails 6" o.c.—joints fin—est. fire rating based on UL Des L501	41	32	CK-6412-6		J
	clg. wt. 3		40	58	Based on 44-oz carpet & 40-oz pad atop flooring— CK-6412-5		
1 hr.		$\frac{1}{2}$ " or $\frac{3}{8}$ " SHEETROCK brand gypsum panels, FIRECODE C core, ceiling—1" nom wd sub & fin flr—2 x 10 wd joist 16" o.c.—susp grid with main run 48" o.c. and cross tees 24" o.c.—panels screw-att below grid—joints fin— UL Des L525	N/A				K
1 hr.		$\frac{3}{8}$ " SHEETROCK brand gypsum panels, FIRECODE C core, ceiling—2x12 wd truss of 2x4 lbr secured with steel truss plates—trusses 24" o.c.— $\frac{3}{4}$ " nom plywd flr—met fur chan 24" o.c. wire-tied to trusses—panels att with 1" Type S screws 12" o.c.—joints fin— UL Des L528	N/A				L
1 hr.		$\frac{3}{8}$ " SHEETROCK brand gypsum panels, FIRECODE C core, ceiling—2x12 wd truss of 2x4 lbr secured with steel truss plates—trusses 24" o.c.— $\frac{3}{4}$ " nom plywd flr—susp grid with main run 48" o.c. and cross tees 24" o.c.—panels att with 1" Type S-12 screws 12" o.c.—joints fin— UL Des L529	N/A				M
1 hr.		$\frac{3}{8}$ " SHEETROCK brand gypsum panels, FIRECODE C core, ceiling— $\frac{3}{8}$ " T&G plywd flr—10" I-shaped wd joist 24" o.c.—met fur chan 24" o.c. clip-att to joist—1" THERMAFIBER insul laid over chan below joists—panels screw att to chan 12" o.c.—joints fin— UL Des L530 based on Truss Joist members— UL Des L531 based on Timjoist, Inc. Type TMI members	47	40	TL-81-87—IN-81-16		N
	clg. wt. 5			54	Based on carpet & pad atop flooring— IN-81-17		
				43	Based on cushioned vinyl atop flooring— IN-81-19		
2 hr.	clg. wt. 5						
1 hr.		Resil ceiling—2 layers $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core—1" nom wd sub & fin flr—2 x 10 wd joist 16" o.c.—RC-1 chan spaced 24" o.c. screw-att over base layer panels—face layer screw att to chan 12" o.c.—joints fin— UL Des L510 —2 hr. sys. with $\frac{3}{8}$ " SHEETROCK brand gypsum panels, FIRECODE C core— UL Des L511	N/A		Assemblies not recommended when sound control is a major factor		O
2 hr.	clg. wt. 5						



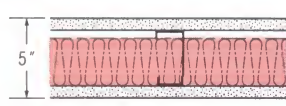
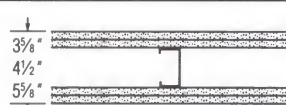

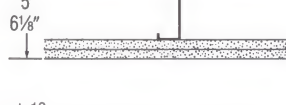
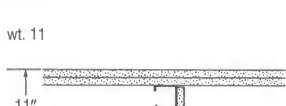


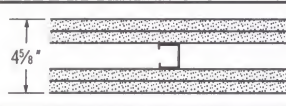
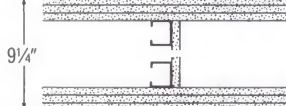
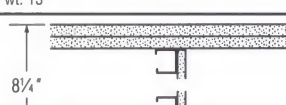

Wood Framed Ceilings

Fire rating	Fire-rated construction		Acoustical performance			System reference
	Detail & physical data	Description & test no.	STC	IIC	Description & test no.	
2 hr.		Floor/ceiling—floor of 8" x 8" ceramic tile, 1/2" DUROCK exterior cement board, 1" SHEETROCK brand gypsum liner panels, 1/2" plywood—2 x 10 wd joist 16" o.c.—3" THERMAFIBER SAFB—ceiling of 2 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, over RC-1 chan 16" o.c.— UL Des L541	60 58 59	52 51 62	RAL-TL89-141 (54MTC)— RAL-IN89-5 Based on vinyl tile over oriented strand board in place of ceramic tile and cement board— RAL-TL89-145 (53 MTC)— RAL-IN89-7 Based on carpet/pad over oriented strand board in place of ceramic tile and cement board— RAL-TL89-146 (54MTC)— RAL-IN89-8	P
2 hr.		Floor/ceiling—floor of carpet/pad, 1 1/2" Type F flooring, 1/2" plywood—2 x 10 wd joists 16" o.c.—3" THERMAFIBER SAFB—ceiling of 2 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, over RC-1 chan 16" o.c.— UL Des L541	59 59 37	69 69 37	RAL-TL90-40 (54 MTC)— RAL-IN90-5 Based on vinyl tile in place of carpet/pad— RAL-TL90-40 (54 MTC)— RAL-IN90-6	Q

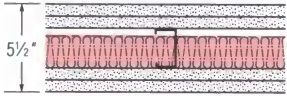
Steel Framed Partitions

Fire rating	Fire-rated construction		Acoustical performance			System reference
	Detail & physical data	Description & test no.	STC	IIC	Description & test no.	
1 hr.		Steel Stud—1/2" SHEETROCK brand gypsum panels, ULTRACODE core—1 1/2" studs 24" o.c.—panels vert appl vert & screw att 1 1/2" Type S screws 8" o.c. perim, 12" o.c. field—joints stag & fin— UL Des U496	N/A			A
1 hr.		Steel Stud—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—2 1/2" studs 24" o.c.—single layer panels ea side appl vert & screw att 1 1/2" THERMAFIBER SAFB—joints fin—perimeter caulked— UL Des U448	45 48		TL-69-42 Based on 3 1/2" studs & 2" SAFB— SA-800422	B
wt. 5						
1 hr. est		Steel Stud—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—1 1/2" studs 24" o.c.—2 layers—base layer 1/2" SHEETROCK brand gypsum panels screw att 1/2" face layer screw att—joints fin—perimeter caulked— GA-WP 1090 —alt. design 2 1/2" studs & 1/2" SHEETROCK brand gypsum panels, FIRECODE core, GA-WP 1015 (55 STC CK-684-14)—alt. design 2 1/2" studs & laminated face layer GA-WP 1051	55 53		CK-684-14 Based on 1/2" thick panels— CK-684-13	C
wt. 7						
1 hr.		Steel Stud—resil partition—1/2" SHEETROCK brand gypsum panels, FIRECODE core—3 1/2" studs 24" o.c.—3" THERMAFIBER SAFB 25" wide creased to fit cavity—RC-1 chan 24" o.c. screw att one side—panels vert appl & screw att—joints stag & fin—perimeter caulked— UL Des U451	55 54		Based on 1/2" SHEETROCK brand gypsum panels, FIRECODE core & 25" wide creased SAFB—SA-850415 Based on 1/2" SHEETROCK brand gypsum panels, FIRECODE core & 24" wide creased SAFB—SA-850415	D
wt. 6						
1 hr. est		Steel Stud—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—2 1/2" studs 24" o.c.—single layer panels one side appl vert & screw att 1 1/2" THERMAFIBER SAFB—2 layers opp side—panels appl vert & screw att—joints stag & fin—perimeter caulked—est. fire rating based on UL Des U448	50 41		SA-800504 Based on same construction without SAFB— TL-69-148	E
wt. 7						
1 hr.		Steel Stud—2 layers 1/2" SHEETROCK brand gypsum panels ea side—1 1/2" studs 24" o.c.—panels appl vert & screw att—joints stag & fin—perimeter caulked— U of C 9-21-64	55		Based on SHEETROCK brand gypsum panels, FIRECODE C core, & 1 1/2" SAFB— USG-840824	F
wt. 9						
1 hr.		Steel Stud—1/2" SHEETROCK brand gypsum panels, FIRECODE core—3 1/2" studs 24" o.c.—single layer panels vert or horiz appl & screw att—joints stag & fin—perimeter caulked— UL Des U465 —based on panels vert or horiz appl— GA-WP-1200	40 49 51		USG-860808 Based on 3" SAFB in cavity— SA-870717 Based on FIRECODE C core panels and 3" SAFB 25" wide, creased to fit cavity— TL-90-166	G
wt. 5						
1 hr.		Steel Stud—1/2" SHEETROCK brand gypsum panels, FIRECODE core—1 1/2" studs 24" o.c.—single layer panels vert appl & screw att 12" o.c.—joints fin—perimeter caulked— U of C 7-31-62	38		USG-860809	H
wt. 6						
1 hr.		Steel Stud—1/2" SHEETROCK brand gypsum panels, FIRECODE core—2 1/2" studs 24" o.c.—1 1/2" THERMAFIBER SAFB—panels apply horiz & screw att—joints opp—vert joints unfin—horiz joints fin— CEG 8-11-83 —rating also applies to assembly with 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, and joints fin— CEG 5-9-84	47		SA-831001	I



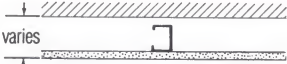

Steel Framed Partitions

Fire rating	Fire-rated construction		Acoustical performance		System reference
	Detail & physical data	Description & test no.	STC	Description & test no.	
1 hr.		Steel Stud Chase Wall— $\frac{5}{8}$ " SHEETROCK brand gypsum panels, FIRECODE core, ea side— $1\frac{1}{2}$ " studs 24" o.c. in 2 rows spaced $6\frac{1}{4}$ " apart— $\frac{5}{8}$ " gypsum panel gussets or steel run braces spanning chase screw att to studs—panels appl vert & screw att—joints stag & fin— UL Des U420	52	Based on $3\frac{1}{2}$ " SAFB on one side— TL-76-155	J
1 hr. (truss 3 hr.)		Steel Stud— $\frac{5}{8}$ " SHEETROCK brand gypsum panels, FIRECODE core, ea side—fireproofed steel truss— $2\frac{1}{2}$ " studs 24" o.c. in 2 rows spaced 8" apart— $\frac{5}{8}$ " gypsum panel gussets spanning chase att to stud at qtr & ctr points—panels appl vert & screw att—joints & fin— UL Des U805	N/A		K
2 hr.		Steel stud— $\frac{3}{4}$ " SHEETROCK brand gypsum panels, ULTRACODE core, ea side— $3\frac{1}{4}$ " or $3\frac{1}{2}$ " studs 24" o.c.—3" THERMAFIBER SAFB—panels vert appl & screw att 8" o.c. perim, 12" o.c. field—joints stag & fin—perimeter caulked— UL Des U491	50	USG-910617	L
2 hr.		Steel Stud—2 layers $\frac{5}{8}$ " SHEETROCK brand gypsum panels, FIRECODE C core, ea side— $1\frac{1}{2}$ ", $2\frac{1}{2}$ " or $3\frac{1}{2}$ " studs 24" o.c.—base layer appl vert, face layer appl vert or horiz. panels appl vert & joints stag—base layer screw att—face layer strip lamin or screw att—joints fin—perimeter caulked—rating based on assembly with or without SAFB— UL Des U412	50 55 52 54	Based on SHEETROCK brand gypsum panels, FIRECODE core, $3\frac{1}{2}$ " stud assembly without SAFB— USG-840817 Based on $3\frac{1}{2}$ " studs and $1\frac{1}{2}$ " SAFB— SA-800421 Based on lamin, face layer, $1\frac{1}{2}$ " SAFB and $2\frac{1}{2}$ " studs— SA-860932 Based on $2\frac{1}{2}$ " studs, screw att. face layer and $1\frac{1}{2}$ " SAFB— CK-654-40	M
2 hr.		Steel Stud—2 layers $\frac{5}{8}$ " SHEETROCK brand gypsum panels, FIRECODE core, plain or vinyl faced vert appl ea side— $2\frac{1}{2}$ " or $3\frac{1}{2}$ " studs 24" o.c.—base layer screw att—face layer lamin or screw att—joints stag & fin or unfin—perimeter caulked— UL Des U411	48 56	Based on $3\frac{1}{2}$ " studs and $\frac{5}{8}$ " SHEETROCK brand gypsum panels, FIRECODE C core— BBN-770408 Based on $3\frac{1}{2}$ " studs and 3" SAFB— USG-840818	N
2 hr.		Steel Stud—2 layers $\frac{5}{8}$ " SHEETROCK brand gypsum panels, FIRECODE core, ea side— $2\frac{1}{2}$ " studs 24" o.c.—panels appl horiz & joints stag—base and face layers screw att—joints fin—perimeter caulked— GA-WP-1548	51 56	Based on $2\frac{1}{2}$ " SAFB in cavity— GA-WP-1548 Based on 2" SAFB in cavity— USG-840819	O
2 hr.		Steel Stud Chase Wall—2 layers $\frac{5}{8}$ " SHEETROCK brand gypsum panels, FIRECODE core, ea side— $1\frac{1}{2}$ " studs 24" o.c. in 2 rows spaced $6\frac{1}{4}$ " apart— $\frac{5}{8}$ " gypsum panel gussets or steel run braces spanning chase screw att to studs—panels appl vert & screw att—joints stag & fin— UL Des U420	52 57	TL-76-162 Based on $3\frac{1}{2}$ " SAFB one side— TL-76-156	P
2 hr.		Steel Stud Chase Wall—2 layers $\frac{5}{8}$ " SHEETROCK brand gypsum panels, FIRECODE C core, ea side— $1\frac{1}{2}$ " studs 24" o.c. in 2 rows spaced $5\frac{1}{2}$ " apart— $\frac{5}{8}$ " gypsum panel gussets spanning chase att to studs at qtr points—panels appl vert & screw att— $1\frac{1}{2}$ " THERMAFIBER SAFB—joints stag & fin—perimeter caulked—est. fire rating based on UL Des U412	55	SA-860907	Q
3 hr.		Steel Stud—3 layers $\frac{5}{8}$ " SHEETROCK brand gypsum panels, FIRECODE C core, ea side— $1\frac{1}{2}$ " studs 24" o.c.—base layers appl vert—face layer appl horiz—panels screw att with joints stag and fin—perimeter caulked—rating based on assembly with or without SAFB— UL Des U435	59	Based on assembly with $1\frac{1}{2}$ " SAFB in cavity— SA-830112	R
3 hr.		Steel stud—2 layers $\frac{5}{8}$ " SHEETROCK brand gypsum panels, ULTRACODE core, ea side— $1\frac{1}{2}$ " studs 24" o.c.—base layer appl vert and att with $1\frac{1}{2}$ " Type S screws 24" o.c., face layer att vert or horiz with $2\frac{1}{4}$ " Type S screws 12" o.c.—att horiz joints with Type G screws midway betw framing (24" o.c.)—joints fin—perimeter caulked— UL Des U435			S
3 hr.		Steel Stud—3 layers $\frac{5}{8}$ " SHEETROCK brand gypsum panels, FIRECODE C core, ea side— $1\frac{1}{2}$ " studs 24" o.c. in 2 rows spaced 3" apart—steel truss member—gypsum panel gussets or steel run braces spanning chase screw att to studs—panels appl vert & screw att—joints stag & fin—2 hr. rating applies with 2 layers panels ea side—1 hr. rating applies with single layer $\frac{5}{8}$ " panels ea side— UL Des U436	N/A		T
3 hr.		Steel stud chase wall—2 layers $\frac{5}{8}$ " SHEETROCK brand gypsum panels, ULTRACODE core, ea side— $1\frac{1}{2}$ " studs 24" o.c. in two rows spaced 2" apart—steel truss member—gypsum panel gussets or stl run braces spanning chase screw-att to studs—base layer app vert and att with $1\frac{1}{4}$ " Type S screws 24" o.c., face layer att vert or horiz with $2\frac{1}{4}$ " Type S screws 12" o.c.—att horiz joints with Type G screws midway betw framing (24" o.c.)—joints stag & fin— UL Des U436			U
4 hr.		Steel Stud—4 layers $\frac{5}{8}$ " SHEETROCK brand gypsum panels, FIRECODE C core, ea side— $1\frac{1}{2}$ " studs 24" o.c.—base layers appl vert—face layer appl horiz—panels screw att with joints stag & fin—perimeter caulked—rating based on assembly with or without SAFB— UL Des U435	62	Based on assembly with $1\frac{1}{2}$ " SAFB in cavity— SA-830113	V

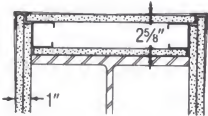
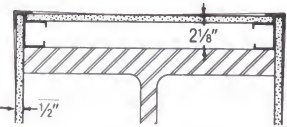
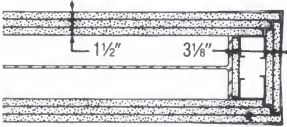
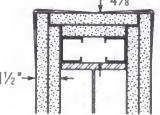
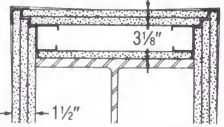
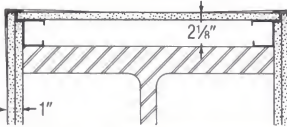
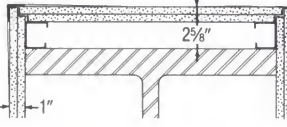
Steel Framed Partitions

Fire rating	Fire-rated construction		Acoustical performance		System reference
	Detail & physical data	Description & test no.	STC	Description & test no.	
4 hr.		Steel stud—2 layers 5/8" SHEETROCK brand gypsum panels, ULTRACODE core, ea side—2 1/2" studs 24" o.c.—2" THERMAFIBER SAFB—base layer app vert, joints stag, & screw att 24" o.c.—face layer app vert or horiz, & screw att 12" o.c.—att along horiz joints with Type G screws midway betw framing (24" o.c.)—joints fin—perimeter caulked— UL Des U490	56	USG-910907	W

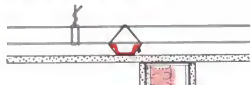
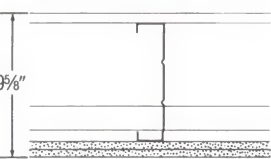
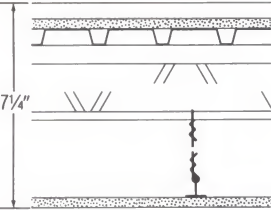
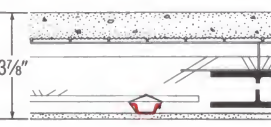
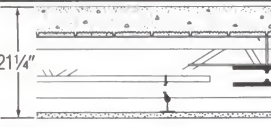
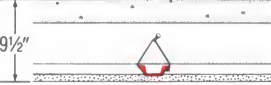
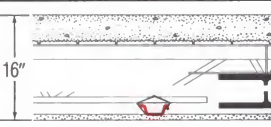
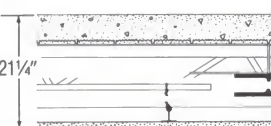
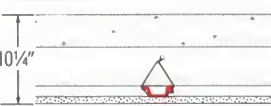
Steel Framed Exterior Wall Furring

Detail & physical data	Description	Comments	System reference
	Metal furring channels 24" o.c., 1/2" SHEETROCK brand gypsum panels, foil-back, screw-attached, joints finished	Good vapor retarder; no limiting height	A
	SHEETROCK Z-furring channels applied vertically 24" o.c., THERMAFIBER fire safety FS-15 blankets between channels, 1/2" SHEETROCK brand gypsum panels, foil-back, screw-attached to channels, joints finished	Noncombustible system with mineral fiber insulation; suitable for up to 3" thick insulation; good vapor retarder; no limiting height	B
	Steel studs 24" o.c., set in runners, 1/2" SHEETROCK brand gypsum panels, foil-back, screw-attached to studs, joints finished	Free-standing; allows for pipe chase clearance; good vapor retarder	C
	SHEETROCK Z-furring channels applied vertically 24" o.c., rigid plastic foam insulation between channels, 1/2" SHEETROCK brand gypsum panels, foil-back, applied vertically and screw-attached to channels, joints finished	Suitable for up to 3" thick insulation; no limiting height	D

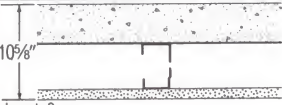
Steel Framed Column Fireproofing

Fire rating	Column type	Fire-rated construction Detail & physical data	Description & test no.	Comments	System reference
2 hr.	W10 x49		Gypsum Drywall Fireprfg—1/2" SHEETROCK brand gypsum panels, FIRECODE C core, around col—double layer over ea flange end—double layer on flange faces separ by 1 1/2", 25-ga. steel studs & screw att—met beads on corners—joints fin— UL Des X518		A
2 hr.	W14 x228		Gypsum Drywall Fireprfg—1/2" SHEETROCK brand gypsum panels, FIRECODE C core, around col—panels screw att to 1 1/2", 25-ga. steel studs at col corners—met corner beads—joints fin— UL Des X521		B
2 hr.	varies		Gypsum Drywall Fireprfg—3 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, around col—triple layer over ea flange end—inner layers on flange face separ by 1 1/2", 25-ga. steel studs & screw att—met beads on corners—joints fin— UL Des X524	Rating applies to tapered or constant-section prefabricated metal building columns	C
2 hr. & 3 hr.	W4x13 W6x15.5 W10x49		2-hr. gypsum drywall fireprfg—2 layers 1/2" SHEETROCK brand gypsum panels, ULTRACODE core, around col—panels screw att to 158ST25 steel studs at corners—met corner beads—joints fin— UL Des X528 3-hr. gypsum drywall fireprfg—3 layers 1/2" SHEETROCK brand gypsum panels, ULTRACODE core, around col, with second layer wrapped with no. 18 SWG steel wire spaced 24" o.c.—panels screw att to 158ST25 steel studs at corners—met corner beads—joints fin— UL Des X528		D E
3 hr.	W10 x49		Gypsum Drywall Fireprfg—3 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, around col—triple layer over ea flange end—inner layers on flange face separ by 1 1/2", 25-ga. steel studs & screws att—met beads on corners—joints fin— UL Des X515		F
3 hr.	W14 x228		Gypsum Drywall Fireprfg—1/2" SHEETROCK brand gypsum panels, FIRECODE C core, around col—double layer over ea web face—panels screw att to 1 1/2", 25-ga. steel studs at col corners—met corner beads—joints fin— UL Des X514		G
4 hr.	W14 x228		Gypsum Drywall Fireprfg—2 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, around col—panels screw att to 1 1/2", 25-ga. steel studs at col corners—met corner beads—joints fin— UL Des X507		H

Steel Framed Ceilings

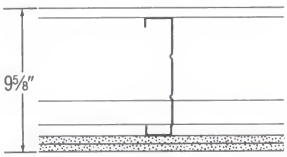

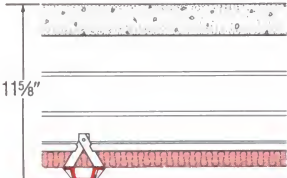
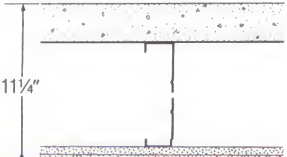
Fire rating	Detail & physical data	Fire-rated construction Description & test no.	Acoustical performance			System reference
			STC	IIC	Description & test no.	
N/A	 clg. wt. 3	5/8" SHEETROCK brand gypsum panels, FIRECODE core—1 1/2" cr chan 4' o.c.—met fur chan 24" o.c.—panels screw att 12" o.c.—joints fin	N/A			A
1 hr. (beam 1 hr.)	 9 5/8"	5/8" SHEETROCK brand gypsum panels, FIRECODE C core—725SJ18 steel joints 24" o.c.—dbl layer gypsum panel clg and 5/8" T&G plywd fir att to joists with Type S-12 screws—dbl layer gypsum panels around beam—joints exp—UL Des L524	39 43 56 60		Based on 95SJ16 joists— USG-760105 Based on 95SJ16 joists and 3" SAFB*— USG-760310 Based on 95SJ16 joists and carpet & pad— USG-760106 Based on 95SJ16 joists and carpet & pad with 3" SAFB*— USG-760405	B
1 1/2 hr.	 27 1/4" clg. wt. 4	5/8" SHEETROCK brand gypsum panels, FIRECODE C core—susp grid with main run 4' o.c. and cross tees 2' o.c.—gypsum panels screw-att below grid—joints stag and fin—min 1" roof insul and 5/8" gypsum bd on steel deck over bar joists—1 hr. rating based on assembly with 1/2" thick panels—UL Des P510	N/A			C
2 hr. (beam 2 hr.)	 13 7/8" clg. wt. 32 hr.	5/8" SHEETROCK brand gypsum panels, FIRECODE C core—furred or susp—met fur chan 24" o.c.—panels att with 1" Type S screws 12" o.c.—joints exp or fin—2 1/2" conc on riblath or corrugated steel deck over bar joist—UL Des G515	N/A			D
2 hr. (beam 3 hr.)	 21 1/4" clg. wt. 3	5/8" SHEETROCK brand gypsum panels, FIRECODE C core—susp grid with main run 4' o.c. and cross tees 2' o.c.—gypsum panels screw-att below grid—joints fin—2 1/2" conc on riblath over bar joist—UL Des G529	N/A			E
2 hr.	 9 1/2" clg. wt. 3	5/8" SHEETROCK brand gypsum panels, FIRECODE C core—met fur chan 24" o.c.—panels att with 1" Type S screws—joints fin—2" prestressed reg or lightwt conc units with 6" deep stems 48" o.c.—UL Des J502—UL Des J503	N/A			F
3 hr. (beam 3 hr.)	 16" clg. wt. 3	5/8" SHEETROCK brand gypsum panels, FIRECODE C core—met fur chan 24" o.c.—panels att with 1" Type S screws 12" o.c.—joints exp or fin—3" conc on corrugated steel deck or on riblath over bar joist—UL Des G512	N/A			G
3 hr. (beam 3 hr.)	 21 1/4" clg. wt. 3	5/8" SHEETROCK brand gypsum panels, FIRECODE C core—susp grid with main run 4' o.c. and cross tees 2' o.c.—gypsum panels screw-att below grid—joints fin—3 1/4" conc on riblath over bar joist—rating also applies with 5/8" panels and 2 1/2" conc slab—UL Des G529	N/A			H
3 hr.	 10 1/4" clg. wt. 3	5/8" SHEETROCK brand gypsum panels, FIRECODE C core—met fur chan 24" o.c.—panels att with 1" Type S screws—joints fin—prestressed 2 1/2" reg or 2 1/2" lightwt conc units with 6" deep stems 48" o.c.—UL Des J502—UL Des J503—UL Des J504	N/A			I

Steel Framed Load Bearing Floors/Ceilings

Fire rating	Fire-rated construction Detail & physical data	Description & test no.	Acoustical performance			System reference
			STC	IIC	Description & test no.	
1 hr.est.	 10 5/8" clg. wt. 3	5/8" SHEETROCK brand gypsum panels, FIRECODE C core—7 1/2", 18-ga. steel joists 24" o.c.—2 1/2" conc fir on corrug steel deck—gypsum panel ceiling att to joists with 1" Type S-12 screws 12" o.c.—joints fin—ext. fire rating based on witnessed laboratory test	45 70		Based on RC-1 resil chan 24" o.c.— KAL-443536 Based on carpet & pad— KAL-443535	A





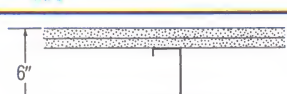
*Insulation may affect fire rating. See SA-905.

Steel Framed Load Bearing Floors/Ceilings

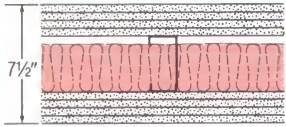
Fire rating	Fire-rated construction		Acoustical performance			System reference
	Detail & physical data	Description & test no.	STC	IIC	Description & test no.	
1 hr. (beam 1 hr.)	 clg. wt. 3	1/2" SHEETROCK brand gypsum panels, FIRECODE C core—7/8", 18-ga. steel joists 24" o.c.—3/4" T&G plywd flr att to joists with Type S-12 screws 6" o.c. around perim., 10" o.c. in field—dbl layer gypsum panel clg and dbl layer gypsum panels around beam—joists exp—includes unrestrained beam— UL Des L524	39		Based on 9/8", 16-ga. joists— USG-760105	B
1 1/2 hr.	 clg. wt. 5	Resilient 1/2" SHEETROCK brand gypsum panels, FIRECODE C core—9/8", 16-ga. steel joists 24" o.c. 3/4" T&G plywd flr att to joists with Type S-12 screws 24" o.c. dbl layer gypsum panel clg att to RC-1 chan screw att to joists 16" o.c.—base panels att with 1" Type S screws 24" o.c.—face panels att with 1 1/2" Type G screws 8" o.c. att butt joints, 1 1/2" type S screws 12" o.c. in field—joists fin— UL Des L527	48 41		USG-771101 Based on carpet & pad— SA-781110	C
2 hr.	 clg. wt. 5	1/2" SHEETROCK brand gypsum panels, FIRECODE C core—7/8", 18-ga. steel joists 24" o.c.—2" conc flr on corrug steel deck—metal fur chan 24" o.c. clip-att to joist—1" THERMAFIBER insul laid over chan below joists—panels screw-att to chan 12" o.c.—joists fin— UL Des G533				D
2 hr. est	 clg. wt. 5	1/2" SHEETROCK brand gypsum panels, FIRECODE C core—7/8", 18-ga. steel joists 24" o.c.—2 1/2" conc flr over corrug steel deck—dbl layer gypsum panel ceiling—base panels att with 1" Type S-12 screws 12" o.c.—face panels att with 1 1/2" Type S-12 screws 12" o.c.—joists stag and fin—est. fire rating based on witnessed laboratory test	44 47	73	KSL-443533 Based on carpet & pad— KAL-443680 Based on RC-1 resil chan 24" o.c.— KAL-443534	E

Fire ratings apply when assemblies are constructed with framing members having heavier gauge and/or larger dimensions.
*Insulation may affect fire rating.

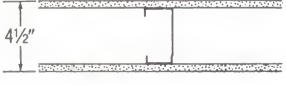
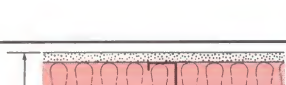
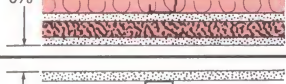
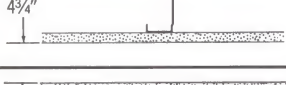


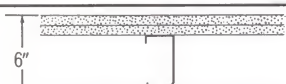
Steel Framed Load Bearing Interior Walls

Fire rating	Fire-rated construction		Acoustical performance			System reference
	Detail & physical data	Description & test no.	STC	IIC	Description & test no.	
45 min.	 wt. 6	1/2" SHEETROCK brand gypsum panels, FIRECODE C core—3/8", 20-ga. studs 24" o.c.—panels appl vert & att with 1" Type S-12 screws 12" o.c.—joists fin— load bearing up to 100% allowable stud axial load—UL Des U425	47		Based on engineering evaluation using 3" SAFB in cavity	A
1 hr.	 wt. 6	1/2" SHEETROCK brand gypsum panels, FIRECODE core—3/8" 20-ga. studs 24" o.c.—panels appl vert & att with 1" Type S-12 Screws 12" o.c.—joists fin— load bearing up to 100% allowable stud axial load—UL Des U425	40 41		USG-810519 Based on 2" SAFB in cavity— USG-810518	B
1 hr.	 wt. 10	Dbl layer 1/2" SHEETROCK brand gypsum panels, FIRECODE C core—3/8", 20-ga. studs 24" o.c.—1", 1 1/2", 2", 3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—panels appl vert with joints stag—base layer att with 1" Type S-12 screws 12" o.c.—face layer att with 1 1/2" Type S-12 screws 12" o.c.—joists fin—rating also applies with IMPERIAL FIRECODE C base and veneer finish surface— load bearing up to 100% allowable stud axial load—UL Des U440	61 51		Based on 3/8", 16-ga. studs, 3/8" thick panels, lateral bracing and 3" SAFB in cavity— SA-830628 Based on 3/4", 20-ga. studs and lateral bracing— SA-840715	C
1 1/2 hr.	 wt. 9	Dbl layer 1/2" SHEETROCK brand gypsum panels, FIRECODE C core—3/8", 20-ga. studs 24" o.c.—panels appl vert—base layer att with 1" Type S-12 screws 12" o.c.—face layer att with 1 1/2" type S-12 screws 12" o.c.—joint fin— load bearing up to 100% allowable stud axial load—UL Des U425	49 49		Based on 2" SAFB— USG-811009 Based on 2" SAFB and 6", 20-ga. studs— USG-810940	D
2 hr.	 wt. 10	Dbl layer 1/2" SHEETROCK brand gypsum panels, FIRECODE core—3/8", 20-ga. studs 24" o.c.—panels appl vert—base layer att with 1" Type S-12 screws 12" o.c.—face layer att with 1 1/2" type S-12 screws 12" o.c.—joists fin— load bearing up to 80% allowable stud axial load—UL Des U425	48 49		Based on 2" SAFB in cavity— USG-811006 Based on 2" SAFB and 6", 20-ga. studs— USG-810937	E

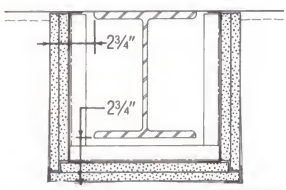
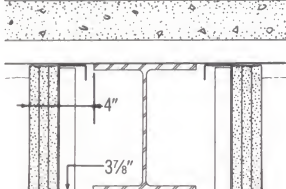
Steel Framed Load Bearing Interior Walls

Fire rating	Fire-rated construction		Acoustical performance			System reference
	Detail & physical data	Description & test no.	STC	IIC	Description & test no.	
3 hr.		Four layers, 1/2" SHEETROCK brand gypsum panels, FIRECODE core, ea side—3 1/2", 20-ga. studs 24" o.c.—1", 1 1/2", 2" or 3" THERMAFIBER SAFB optional—base layers appl vert with joints stag—base panels att with Type S-12 screws 48" o.c.—face layer appl vert or horiz with 2 3/4" Type S-12 screws 12" o.c. and 1 1/2" type G screws in panels—rating also applies with IMPERIAL FIRECODE C base and veneer finish surface—load bearing up to 100% allowable stud axial load—UL Des U426				F
	wt. 18					

Steel Framed Load Bearing Exterior Walls



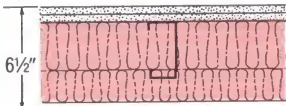
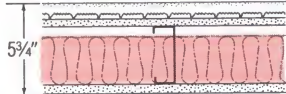
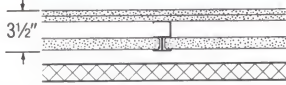
Fire rating	Fire-rated construction		Acoustical performance			System reference
	Detail & physical data	Description & test no.	STC	IIC	Description & test no.	
45 min.		1/2" SHEETROCK brand gypsum sheathing, FIRECODE core, exterior—3 1/2", 20-ga. studs 24" o.c.—1/2" SHEETROCK brand gypsum panels, FIRECODE C core, interior—panels appl vert & att with 1" Type S-12 screws 12" o.c.—load bearing up to 100% allowable stud axial load—UL Des U425				A
45 min*		1/2" SHEETROCK brand gypsum sheathing, exterior—3 1/2", 20-ga. studs 24" o.c.—3/4" SHEETROCK brand gypsum panels, FIRECODE core, interior—panels appl vert & att with 1" Type S-12 screws 12" o.c.—load bearing up to 100% allowable stud axial load—UL Des U425				B
1 hr.		1/2" SHEETROCK brand gypsum sheathing—3 1/2", 20-ga. studs 24" o.c.—1" extruded polystyrene insulation installed horiz—1/2" cedar plywood exterior—3/4" THERMAFIBER FS-15 insul blkts studs—1/2" SHEETROCK brand gypsum panels, FIRECODE C core, interior—load bearing up to 60% allowable stud axial load—CEG 12-7-79				C
1 hr.		1/2" SHEETROCK brand gypsum sheathing, FIRECODE core, exterior—3 1/2", 20-ga. studs 24" o.c.—3/4" SHEETROCK brand gypsum panels, FIRECODE core, interior—panels appl vert & att with 1" Type S-12 screws 12" o.c.—load bearing up to 100% allowable stud axial load—UL Des U425	44		Est ± STC based on computer simulation using 3" sound atten fire blankets	D
1 1/2 hr.		Dbl layer 1/2" SHEETROCK brand gypsum sheathing, FIRECODE core, exterior—3 1/2", 20-ga. studs 24" o.c.—dbl layer 1/2" SHEETROCK brand gypsum panels, FIRECODE core, interior—base layers att with 1" Type S-12 screws 12" o.c.—face layers att with 1 1/2" Type S-12 screws 12" o.c.—load bearing up to 100% allowable stud axial load—UL Des U425				E
1 1/2 hr.*		1/2" SHEETROCK brand gypsum sheathing, exterior—3 1/2", 20-ga. studs 24" o.c.—dbl layer 1/2" SHEETROCK brand gypsum panels, FIRECODE core, interior—base layers att with 1" Type S-12 screws 12" o.c.—face layers att with 1 1/2" Type S-12 screws 12" o.c.—load bearing up to 100% allowable stud axial load—UL Des U425				F
2 hr.		Dbl layer 1/2" SHEETROCK brand gypsum sheathing, FIRECODE core, exterior—3 1/2", 20-ga. studs 24" o.c.—dbl layer 1/2" SHEETROCK brand gypsum panels, FIRECODE core, interior—base layer att with 1" type S-12 screws 12" o.c.—face layer att with 1 1/2" type S-12 screws 12" o.c.—load bearing up to 80% allowable stud axial load—UL Des U425	50		Est. ± STC based on computer simulation using 3" SAFB	G

Steel Framed Beams

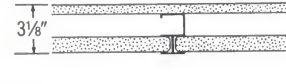

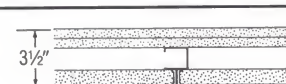



Fire rating	Beam type	Fire-rated construction		Comments	System reference
		Detail & physical data	Description & test no.		
2 hr. (beam only)	W8 x24		Gypsum Drywall Caged Beam Fireprfg—1 1/2" steel run chan brackets 24" o.c.—1 1/2" x 1/2" corner angles att to chan brackets—dbl layer 1/2" SHEETROCK brand gypsum panels, FIRECODE core, att with Type S screws—met beads on corners—joints fin—2 1/2" conc deck on fluted steel flr—UL Des N501—UL Des N502	Design N502 based on 1 1/2" steel runner for corner angles and coped brackets	A
3 hr. (beam only)	W8 x24		Gypsum Drywall Caged Beam Fireprfg—1 1/2" steel run chan brackets 24" o.c.—1 1/2" x 1/2" corner angles att to brackets—3 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE core, att with Type S screws—1" 20-ga. hex mesh on bottom over middle layer—met beads on corners—joints fin—2 1/2" conc deck on fluted steel flr—UL Des N505	Extends drywall use to beam protection. Fire rating for restrained assembly; 2-hour rating for unrestrained assembly	B

*Rating applicable to fire exposure on interior face only

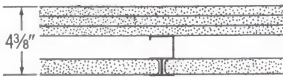
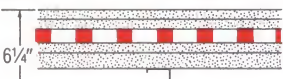
Steel Framed Non-load Bearing Exterior Curtain Walls

Fire rating	Fire-rated construction Detail & physical data	Description	Comments	System reference
1 hr.		35SJ20 steel studs 24" o.c.—1/2" gypsum sheathing—1" extruded polystyrene insulation installed horizontally—1/2" cedar plywood exterior—3/4" THERMAFIBER fire safety FS-15 blankets between studs—1/2" SHEETROCK brand gypsum panels, FIRECODE C core, interior—joints fin— CEG 11-9-79		A
1 1/2 hr.		Glass-fiber reinforced concrete panels, 6'8 1/2" x 7'0", 1/2" thick, bolted to frame—40SJ16 steel studs 16" o.c. anchored to panel—5" THERMAFIBER CW-40 curtain wall insulation in cavity—1/2" SHEETROCK brand gypsum panels, FIRECODE C core, interior screw-attached to studs—joints finished— CEG 2-3-82		B
2 hr.		Glass-fiber reinforced concrete panels, 6'8 1/2" x 7'0", 1/2" thick, bolted to frame—40SJ16 steel studs 16" o.c. anchored to panel—5" THERMAFIBER CW-40 curtain wall insulation in cavity—double-layer 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, interior—joints finished— CEG 4-23-82		C
2 hr.		358ST20 steel studs 16" o.c.—1/2" gypsum sheathing—self-furring metal lath—1" cement-lime stucco exterior 3" THERMAFIBER fire safety FS-15 blankets between studs—1/2" SHEETROCK brand gypsum panels, foil-back, FIRECODE C core, or IMPERIAL FIRECODE C gypsum base and 1/2" IMPERIAL finish interior— T-4851-0SU		D
2 hr.		C-H stud system—1" SHEETROCK brand liner panels set between 25-gauge steel C-H studs on exterior—2 layers SHEETROCK brand gypsum panels, FIRECODE C core, screw attached on interior—joints finished— U of C 4-2-75		E

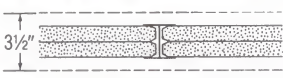

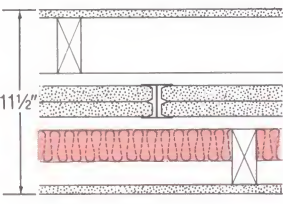
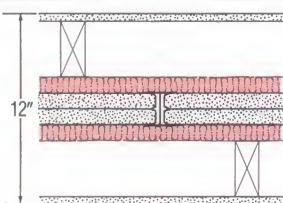
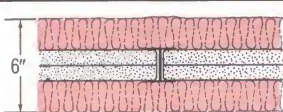
Cavity Shaft Walls

Fire rating	Fire-rated construction Detail & physical data	Description & test no.	Acoustical performance STC	Description & test no.	System reference
1 hr.		Cavity Shaft Wall Gypsum Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core, one side—1" SHEETROCK brand gypsum liner panels set betw 25-g steel C-H studs 24" o.c.—panels appl to side opp liner panels & screw att—joints fin—fire rating also applies with IMPERIAL FIRECODE C base and veneer finish surface— UL Des U469	N/A		A
2 hr.		Cavity Shaft Wall—1" SHEETROCK brand gypsum liner panels, set betw 4" 52 USG steel C-H studs 24" o.c. one side—1/2" SHEETROCK brand gypsum panels, ULTRACODE core, other side—3" THERMAFIBER SAFB—panels appl & screw att 8" o.c. perim, 12" o.c. field—joints stag & fin—vert perimeter caulked— UL Des U492	52	SA-910013	B
2 hr.		Cavity Shaft Wall Gypsum Drywall—2 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, one side—1" SHEETROCK brand gypsum liner panels set betw 25-ga. steel C-H studs 24" o.c.—panels appl vert to side opp liner panels & screw att—joints fin—rating also applies with IMPERIAL FIRECODE C base and veneer finish surface or THERMAFIBER SAFB in cavity—fire-tested both sides— UL Des U438	39 47	USG-750302 Based on 1" SAFB in cavity— BBN-750706	C
2 hr.		Cavity Shaft Wall Gypsum Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—1" SHEETROCK brand gypsum liner panels set betw 25-ga. steel C-H studs 24" o.c.—single layer panels ea side appl vert & screw att—joints stag on opp sides & fin—rating applies with IMPERIAL FIRECODE C base and veneer finish surface—fire-tested both sides— UL Des U467	N/A		D
2 hr. est		Cavity Shaft Wall Gypsum Drywall—2 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core one side—1" SHEETROCK brand gypsum liner panels set betw 25-ga. steel C-H studs 24" o.c.—RC-1 chan spaced 24" o.c.—1 1/2" THERMAFIBER SAFB—panels & RC-1 chan screw att to side opp liner panels—base layer appl horiz—face layer appl vert—joints fin—est. fire rating based on U of C 2-8-72 and U of C 6-23-75—rating also applies with IMPERIAL FIRECODE C base and veneer finish	51	BBN-750412	E
2 hr.		Cavity Shaft Wall Cement Board/Gypsum Drywall—1/2" DUROCK interior cement board—1/2" SHEETROCK brand gypsum panels, FIRECODE core—1" SHEETROCK brand gypsum liner panels set betw 20-ga. min C-H studs 24" o.c.—1 1/2" THERMAFIBER SAFB—cement board screw att & laminated to gypsum panel with 4" strip DURABOND ceramic tile mastic applied with 1/4" notched trowel midway betw studs—joints fin— UL Des U459	N/A		F


Cavity Shaft Walls

Fire rating	Fire-rated construction		Acoustical performance		System reference
	Detail & physical data	Description & test no.	STC	Description & test no.	
3 hr. est.	 4 3/8" wt. 12	Cavity Shaft Wall Gypsum Drywall—3 layers 5/8" SHEETROCK brand gypsum panels, FIRECODE C core, one side—1" SHEETROCK brand gypsum liner panels set betw USG steel C-H studs 24" o.c.—panels screw att to side opp liner panels with joints stag—base & face layers appl vert—mid layer apply horiz—joints fin—est. fire rating based on U of C 2-16-72—rating also applies with IMPERIAL FIRECODE C base and veneer finish surface	N/A		G
4 hr. est.	 6 1/4" wt. 16	Cavity Shaft Wall Gypsum Drywall—2 layers 5/8" SHEETROCK brand gypsum panels, FIRECODE C core, face side—1" SHEETROCK brand gypsum liner panels set betw USG steel C-H studs 24" o.c.—1" liner panels & 5/8" gypsum panel core screw att to studs—horiz met fur chan 24" o.c.—face side panels screw att to fur chan—panels appl vert with joints stag—joints fin—est. fire rating based on U of C 5-24-74—rating also applies with IMPERIAL FIRECODE C base and veneer finish surface	N/A		H



Solid-Type Area Separation Walls

Fire rating	Fire-rated construction		Acoustical performance		System reference
	Detail & physical data	Description & test no.	STC	Description & test no.	
2 hr.	 3 1/2"	Solid Area Separation Wall—two 1" SHEETROCK brand gypsum liner panels set betw USG one-piece steel H-studs 24" o.c.—min. 3/8" air space both sides separating liner panels from any adjacent construction— UL Des U336	N/A		A
2 hr. est..	 7 1/2"	Solid Area Separation Wall—two 1" SHEETROCK brand gypsum liner panels set betw USG one-piece steel H-studs 24" o.c.—1" THERMAFIBER SAFB stapled over gypsum liner panels—5/8" SHEETROCK brand gypsum panels—perim caulked—est. fire rating based on WHI-495-PSV-0245	47	Based on no SAFB— TL-88-234	B
2 hr.	 11 1/2"	Solid Area Separation Wall—5/8" SHEETROCK brand gypsum panels—two 1" SHEETROCK brand gypsum liner panels set betw USG one-piece steel H-studs 24" o.c.—2x4 wd studs 16" o.c. each side on 2x4 plates min. 3/8" from liner panels—2" THERMAFIBER SAFB in one cavity—gypsum panels att with 1 1/4" Type W screws 12" o.c.—joints stag & fin.—perim caulked— UL Des U336	54 46 58 57 60 45 54 57	TL-88-348 Based on 2x4s and no SAFB— TL-88-353 Based on 2x4s and 2" SAFB on both sides— TL-88-347 Based on 2x4s and 3" SAFB on one side— TL-88-351 Based on 2x4s and 3" SAFB on both sides— TL-88-350 Based on 2x3s, 5/8" gypsum panels, no SAFB— BBN-730104 Based on 2x3s, 5/8" gypsum panels, 2" SAFB one side— BBN-730103 Based on 2x3s, 5/8" gypsum panels, 2" SAFB both sides— BBN-730102	C
2 hr.	 12"	Solid Area Separation Wall—two 1" SHEETROCK brand gypsum liner panels set betw USG one-piece steel H-studs 24" o.c.—2x4 wd studs 16" o.c. each side on 2x4 plates min. 3/8" from liner panels—1" THERMAFIBER SAFB stapled to both sides of liner panels—5/8" SHEETROCK brand gypsum panels facing ea side— WHI-495-PSV-0245	53 50	TL-88-346 Based on 1" SAFB one side— TL-88-344	D
3 hr.	 6"	Solid Area Separation Wall—two 1" SHEETROCK brand gypsum liner panels set betw USG one-piece steel H-studs 24" o.c.—2" THERMAFIBER SAFB both sides—blkts appl horiz with joints stag and staple-att to liner panels— WHI-495-0393/0394	N/A		E

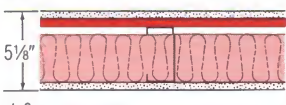
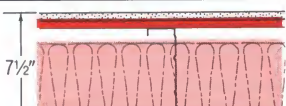
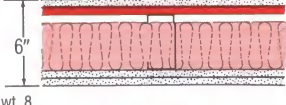
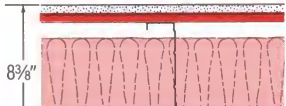
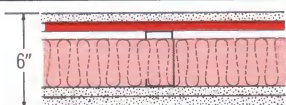

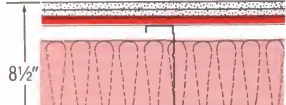
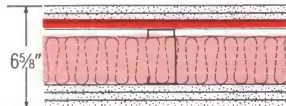
Cavity-Type Area Separation Walls

Fire rating	Fire-rated construction		Acoustical performance		System reference
	Detail & physical data	Description & test no.	STC	Description & test no.	
2 hr.	 3 1/2" wt. 9	Cavity Area Separation Wall—5/8" SHEETROCK brand gypsum panels, water-resistant, FIRECODE C core—1" SHEETROCK brand gypsum liner panels set betw USG 25-ga. steel C-H studs 24" o.c.—single layer panels ea side appl vert & screw att—joints stag on opp sides & fin—perim caulked— UL Des U467	47	Based on 1" SAFB in cavity— BBN-750704	A

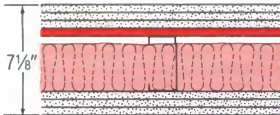
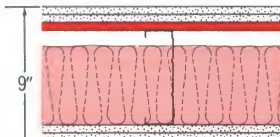
Cavity-Type Area Separation Walls

Fire rating	Fire-rated construction		Acoustical performance		System reference
	Detail & physical data	Description & test no.	STC	Description & test no.	
2 hr. est	 wt. 10	Cavity Area Separation Wall— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, water-resistant, FIRECODE C core—1" SHEETROCK brand gypsum liner panels set betw USG 25-ga. steel C-H studs 24" o.c.—RC-1 chan 24" o.c. screw att to side opp liner panels— $\frac{1}{4}$ " THERMAFIBER SAFB—single layer panels ea side appl vert & screw att—joints stag on opp sides & fin—perim caulked— UL Des U467	50	Based on $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core— BBN-750411	B
3 hr. est	 wt. 14	Cavity Area Separation Wall— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core—1" SHEETROCK brand gypsum liner panels set betw USG 25-ga. steel C-H studs 24" o.c.—RC-1 chan 24" o.c. screw att to side opp liner panels— $\frac{1}{4}$ " THERMAFIBER SAFB—single layer panels one side appl vert & screw att—2 layers opp side screw att to chan—base layer appl horiz—face layer appl vert—joints fin—perim caulked—est. fire rating based on U of C 2-16-72	57	BBN-730622	C

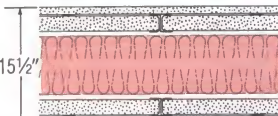
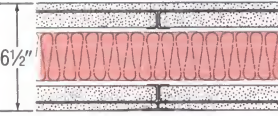
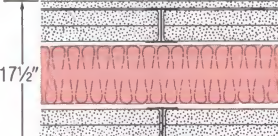
High-Attenuation Resilient/Steel Framed Systems

Fire rating	Fire-rated construction		Acoustical performance		System reference
	Detail & physical data	Description & test no.	STC	Description & test no.	
1 hr.	 wt. 6	Resil Stud Drywall— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core—362SJ20 studs 24" o.c.—3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—single-layer gypsum panels screw-att to studs & RC-1 chan—panels appl vert with joints stag—joints fin—perimeter caulked— UL Des U451	50 54	RAL-TL-87-156 (42 MTC) Based on $\frac{1}{2}$ " thick panels— RAL-TL-83-216 (47 MTC)	A
1 hr.	 wt. 6	Resil Stud Drywall— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core—60SJ20 studs 24" o.c.—5" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—single-layer gypsum panels screw-att to studs & RC-1 chan—panels appl vert with joints stag—joints fin—perimeter caulked— UL Des U451	56 56	RAL-TL-87-139 (48 MTC) Based on $\frac{1}{2}$ " thick panels— RAL-TL-84-141 (50 MTC)	B
1 1/2 hr.	 wt. 8	Resil Stud Drywall— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core—362SJ20 24" o.c.—3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—2 layers gypsum panels screw-att to studs, 1 layer screw-att to chan—panels appl vert with joints stag—joints fin—perimeter caulked— UL Des U452	58	RAL-TL-83-215 (52 MTC)	C
1 1/2 hr.	 wt. 9	Resil Stud Drywall— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core—60SJ20 studs 24" o.c.—5" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—2 layers gypsum panels screw-att to studs, 1 layer screw-att to chan—panels appl vert with joints stag—joints fin—perimeter caulked— UL Des U452	59	RAL-TL-84-140 (54 MTC)	D
2 hr.	 wt. 9	Resil Stud Drywall— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core—362SJ20 studs 24" o.c.—3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—single-layer gypsum panels screw-att to studs, 2-layers screw-att to chan—panels appl vert with joints stag—joints fin—perimeter caulked— UL Des U453	58 60	Estimated sound test (52 MTC) Based on $\frac{1}{2}$ " thick panels, 60SJ20 studs, 5" SAFB— RAL-TL-87-140 (54 MTC) Based on $\frac{1}{2}$ " thick panels, 60SJ20 studs, 5" SAFB— RAL-TL-84-136 (54 MTC)	E
2 hr.	 wt. 10	Resil Stud Drywall— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core—362SJ20 studs 24" o.c.—3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—2 layers gypsum panels screw-att to studs, 2 layers screw-att to chan—panels appl vert with joints stag—joints fin—perimeter caulked— UL Des U454	60 61	RAL-TL-87-154 (54 MTC) Based on $\frac{1}{2}$ " thick panels— RAL-TL-83-214 (57 MTC)	F
2 hr.	 wt. 10	Resil Stud Drywall— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core—60SJ20 studs 24" o.c.—5" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—double-layer gypsum panels screw-att to studs & RC-1 chan—panels appl vert with joints stag—joints fin—perimeter caulked— UL Des U454	63 62	RAL-TL-87-141 (59 MTC) Based on $\frac{1}{2}$ " thick panels— RAL-TL-84-139 (58 MTC)	G
3 hr	 wt. 12	Resil Stud Drywall— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core—362SJ20 studs 24" o.c.—3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—3 layers gypsum panels screw-att to studs, 2 layers screw-att to chan—panels appl vert with joints stag—joints fin—perimeter caulked— UL Des U455	61 62	RAL-TL-87-153 (56 MTC) Based on $\frac{1}{2}$ " thick panels— RAL-TL-83-213 (59 MTC)	H

High-Attenuation Resilient/Steel Framed Systems

Fire rating	Fire-rated construction		Acoustical performance		System reference
	Detail & physical data	Description & test no.	STC	Description & test no.	
3 hr.		Resil Stud Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—362SJ20 studs 24" o.c.—3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—3 layers gypsum panels screw-att to studs, 3 layers screw-att to chan—appl vert with joints stag—joints fin—perimeter caulked— UL Des U455	63 65	RAL-TL-87-152 (58 MTC) 60SJ20 studs, 5" SAFB— RAL-TL-87-142 (61 MTC)	I
wt. 14					
3 hr.		Resil Stud Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—60SJ20 studs 24" o.c.—5" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—3 layers gypsum panels screw-att to stud, 2 layers screw-att to chan—panels appl vert with joints stag—joints fin—perimeter caulked— UL Des U455	64 63 65	RAL-TL-87-142 (59 MTC) Based on 3/4" thick panels— RAL-TL-84-138 (59 MTC) Based on 1/2" thick panels, acoustical sealant bead between panels and studs, dabs 8" o.c. between panel layers on stud side— RAL-TL-84-150 (60 MTC)	J
wt. 12					

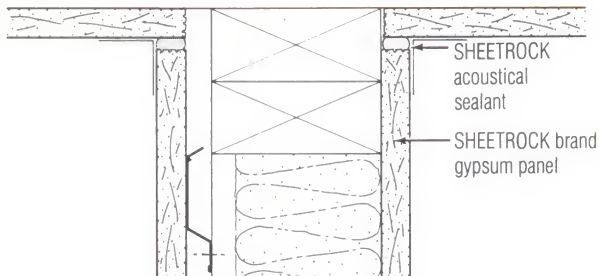
High-Attenuation Double Wall Systems

Fire rating	Fire-rated construction		Acoustical performance		System reference
	Detail & physical data	Description & test no.	STC	Description & test no.	
3 hr.		Double Wall Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—one row of single-layer, one row of double-layer 1" SHEETROCK brand gypsum liner panels spaced 12 1/2" apart and screw-att to steel angle runners—liner panels set betw 1" and 2" H-splines 24" o.c.—12" THERMAFIBER SAFB in cavity—face panels screw-att to H-splines—1/2" bead SHEETROCK acoustical sealant for damping vertical centerline, caulking perimeter—joints fin— UL Des U441	69 69	TL-83-226 (MTC 62) TL-83-231 (MTC 61) Based on 1" panels spaced 6 1/2" apart and 6" SAFB in cavity, and vertical centerline acoust sealant beads	A
3 hr.		Double Wall Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—two rows of SHEETROCK brand gypsum liner panels spaced 3 1/2" apart and screw-att to steel angle runners—liner panels set betw 1" H-splines 24" o.c.—3" THERMAFIBER SAFB in cavity—face panels screw-att to H-splines—perim caulked—joints fin—rating also applies with SHEETROCK brand gypsum panels, water-resistant, FIRECODE C core— UL Des U441	57 60 62 63 65	TL-83-211 (MTC 57) TL-83-313 (MTC 57) Based on vertical centerline acoust sealant beads TL-83-232 (MTC 60) Based on 1" panels spaced 6 1/2" apart, 6" SAFB in cavity, and vertical centerline acoust sealant beads TL-83-222 (MTC 58) Based on one row of single-layer, one row of double-layer, liner panels TL-83-229 (MTC 62) Based on 1" panels spaced 12 1/2" apart, on dbl-row 6" (12") SAFB in cavity, and vertical centerline acoust sealant beads	B
wt. 13					
3 hr.		Double Wall Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—two rows of 1" SHEETROCK brand gypsum liner panels spaced 12 1/2" apart and screw-att to steel angle runners—liner panels set betw 1" H-splines 24" o.c.—12" THERMAFIBER SAFB in cavity—face panels screw-att to H-splines—1/2" bead SHEETROCK acoustical sealant for damping vertical centerline, caulking perimeter—joints fin— UL Des U441	65	TL-83-229 (MTC 62)	C

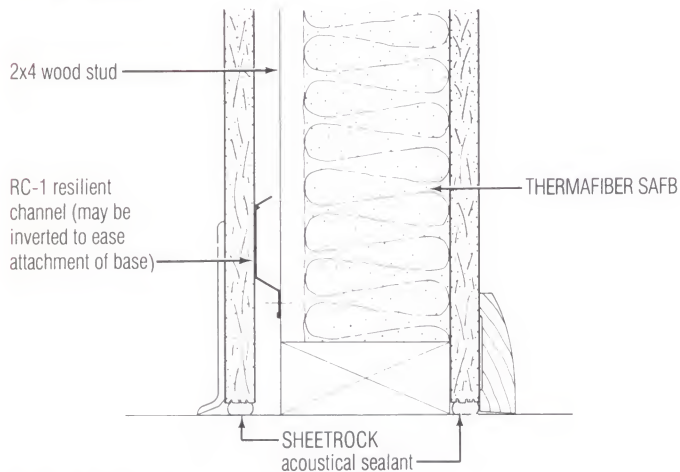
Wood Framed Systems

Details/partitions

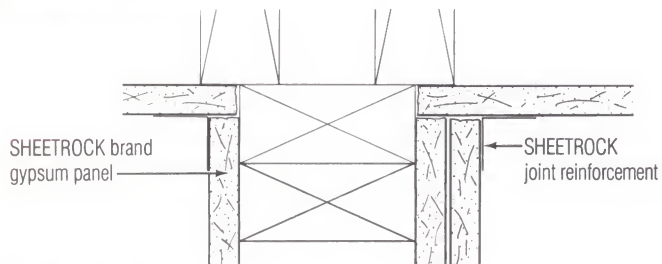
Ceiling attachment



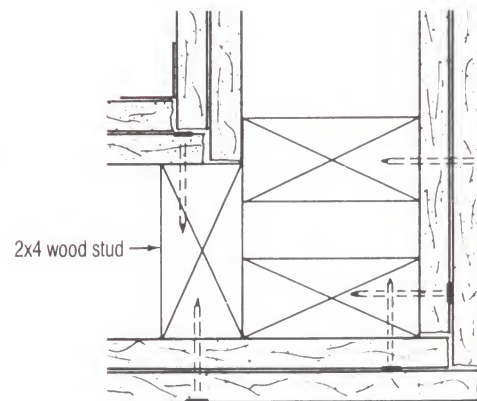
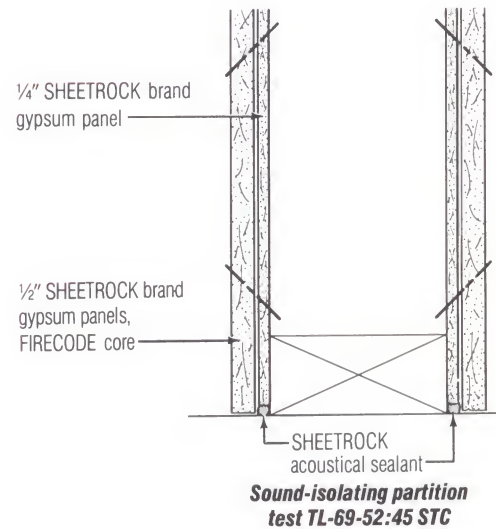
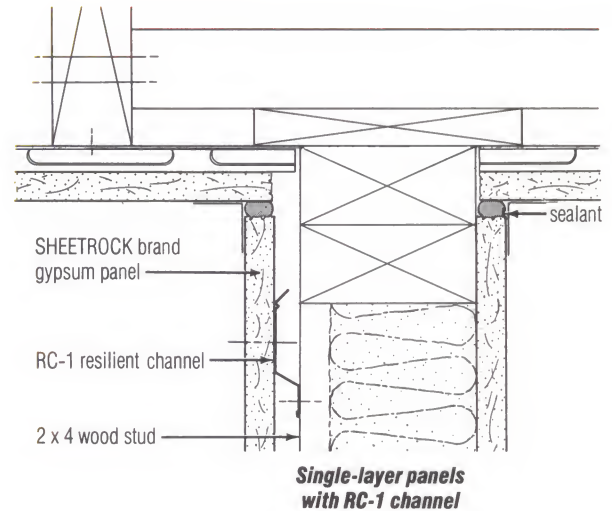
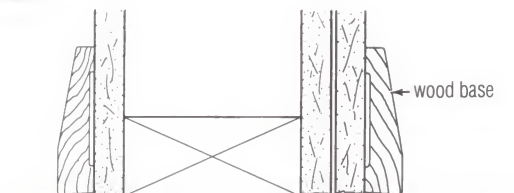
Floor attachment



Ceiling attachment



Floor attachment

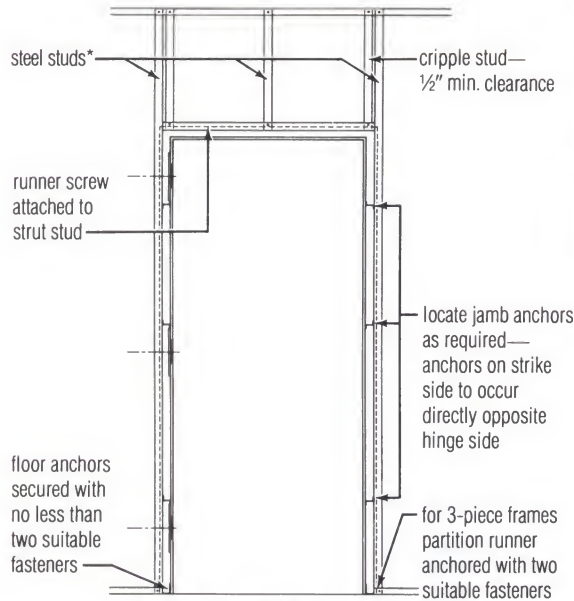


Inside/outside corner

for additional details see drywall/wood framed systems/SA-924

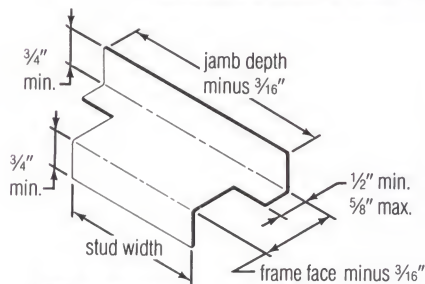
Steel Framed Systems

Door frame



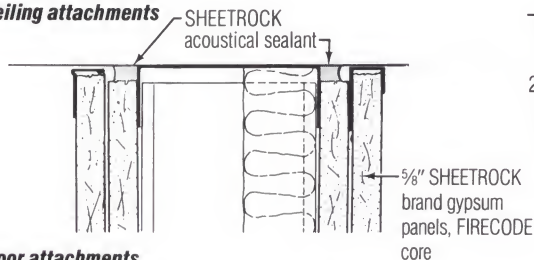
Elevation cross section through frame

Note: In long runs treat window openings in same manner as doors.

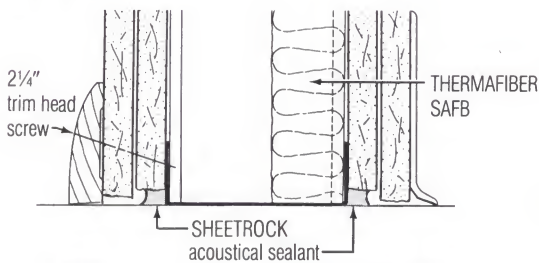


Jamb anchors furnished with frame

Ceiling attachments

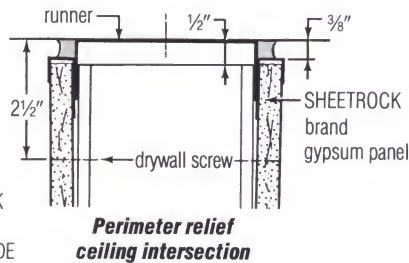


Floor attachments



Wood

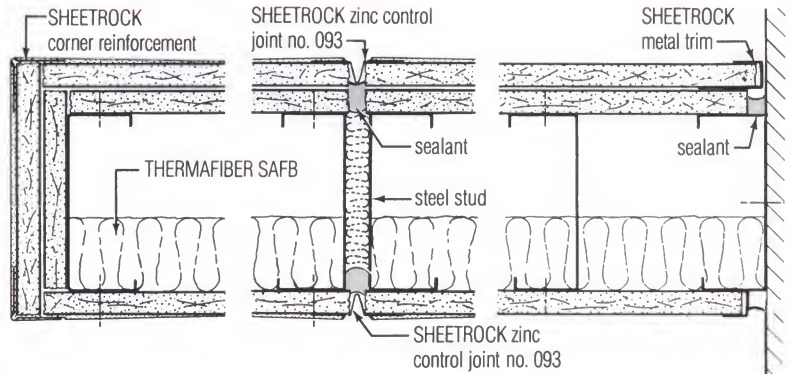
Top set



Perimeter relief ceiling intersection

Top set

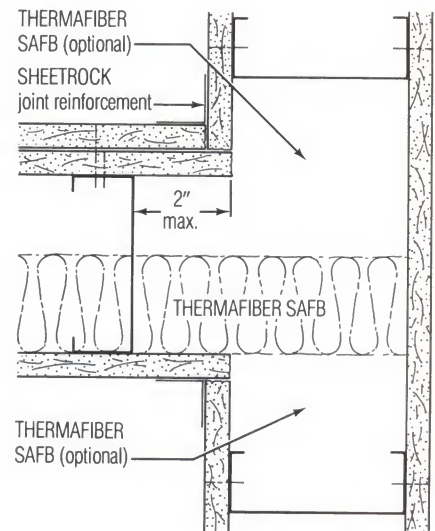
Wood



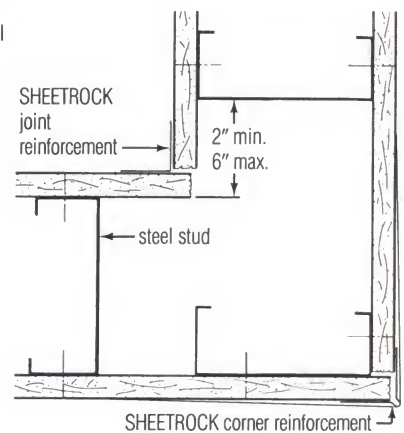
Partition terminal

Wall control joint

Perimeter relief wall intersection



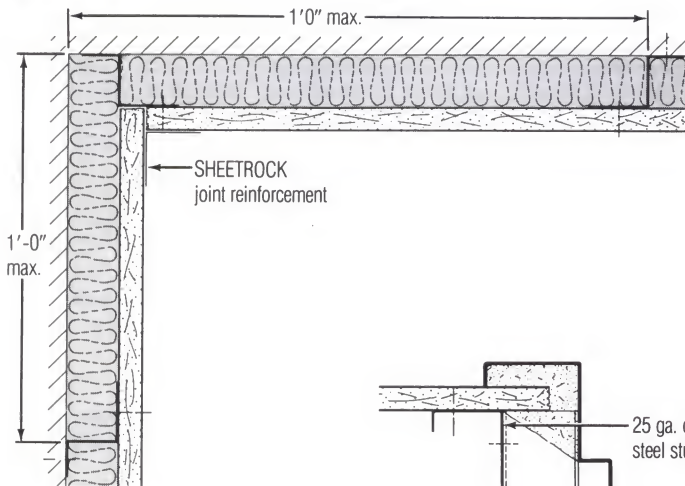
Sound-isolating partition intersection



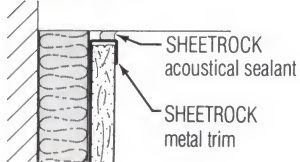
Partition corner

Steel Framed Systems

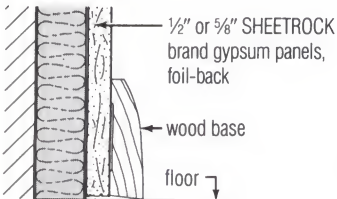
Interior corner



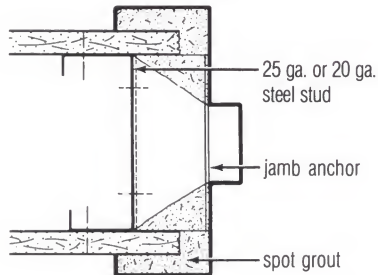
Ceiling attachment



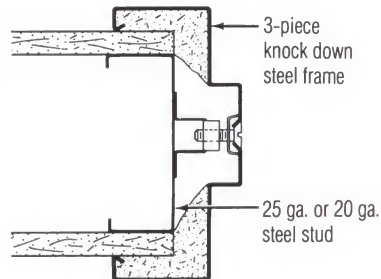
Floor attachment



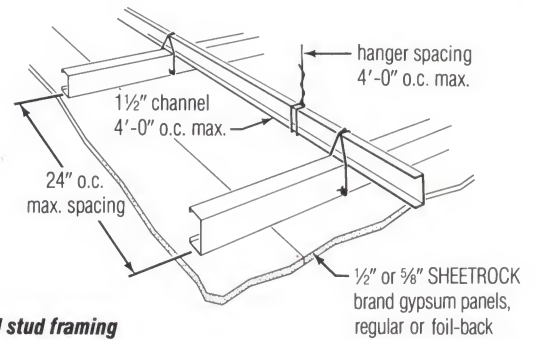
Note: details apply to rigid foam insulation and fire safety FS-15 blanket



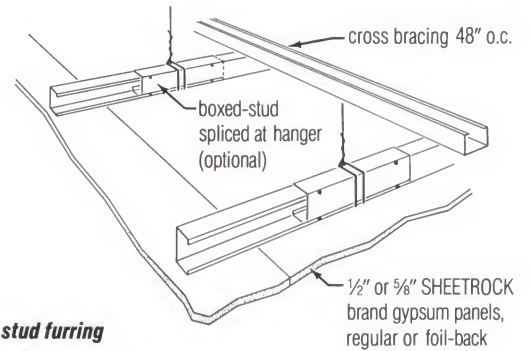
Jamb



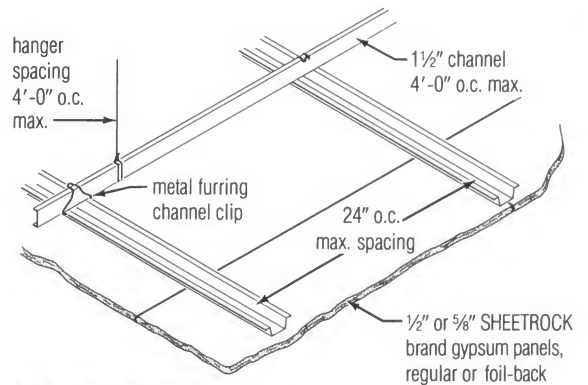
Jamb



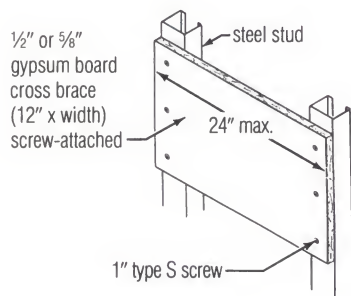
Steel stud framing



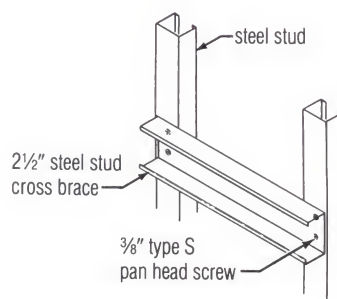
Steel stud furring



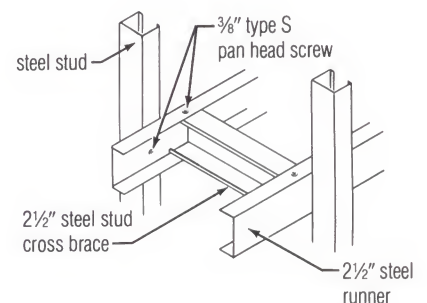
Metal furring channel



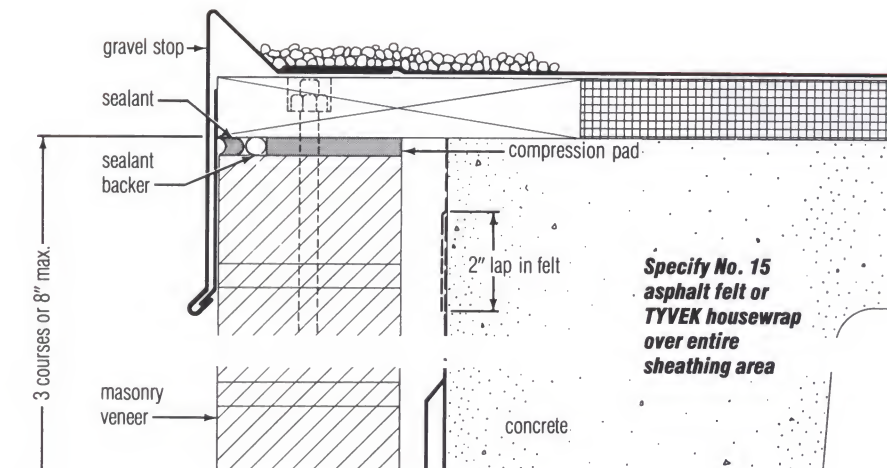
Gypsum brace



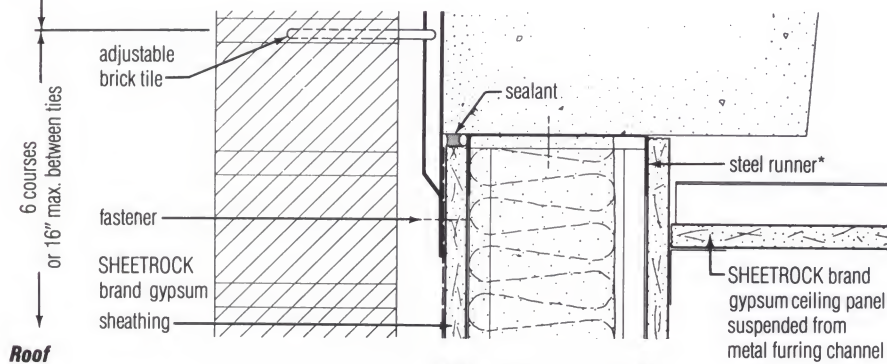
Steel stud brace



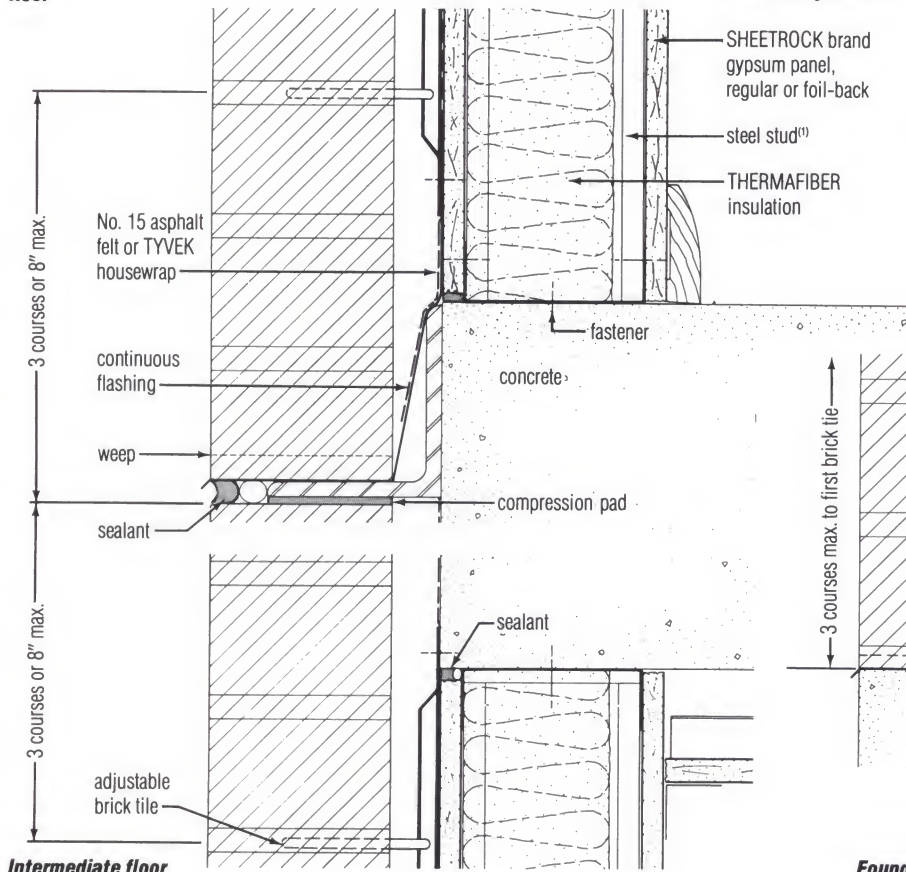
Steel stud and runner brace



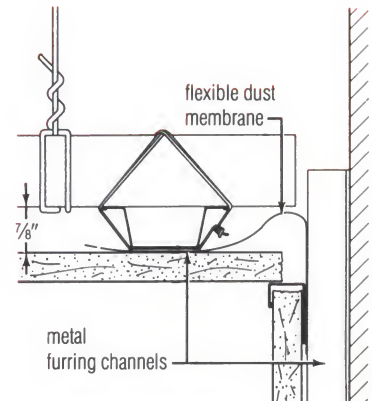
Specify No. 15 asphalt felt or TYVEK housewrap over entire sheathing area



Roof



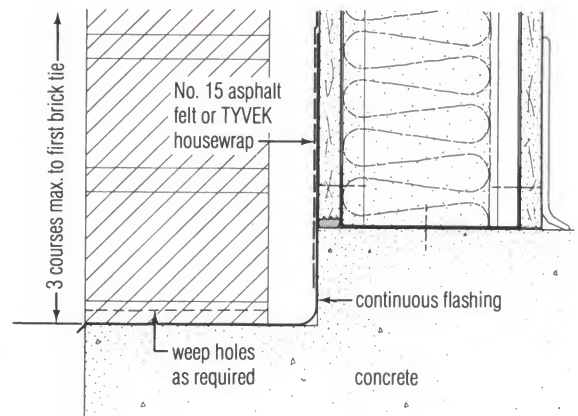
Intermediate floor



Wall intersection

Note: Consult BIA technical note 288, revised February 1987, for framing recommendations for brick veneer buildings exceeding three stories in height.

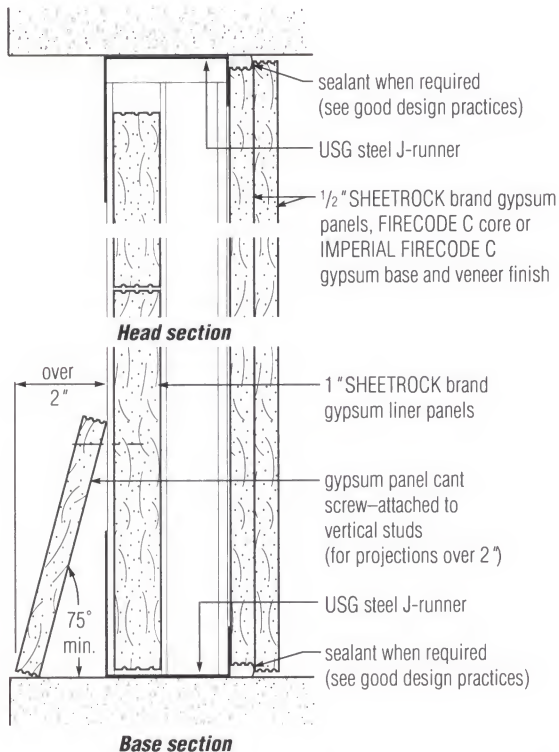
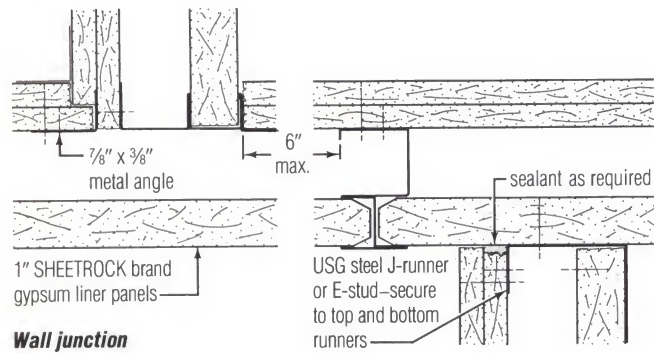
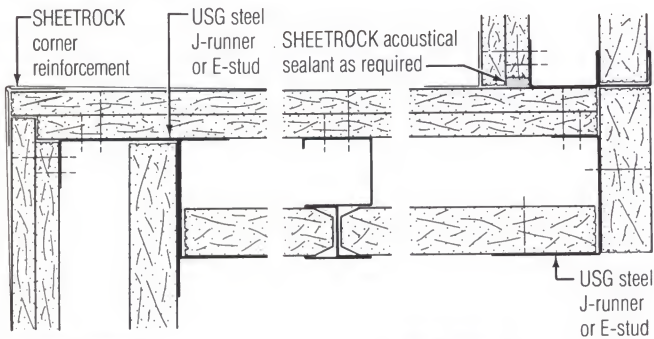
(1) **Note:** The architect and/or structural engineer shall determine appropriate selection and placement of brick ties, flashing, weep holes, wall cavity width, masonry bridging requirements, mortar selection, and workmanship requirements.



Foundation

Cavity Shaft Walls

Details - UL Design U438

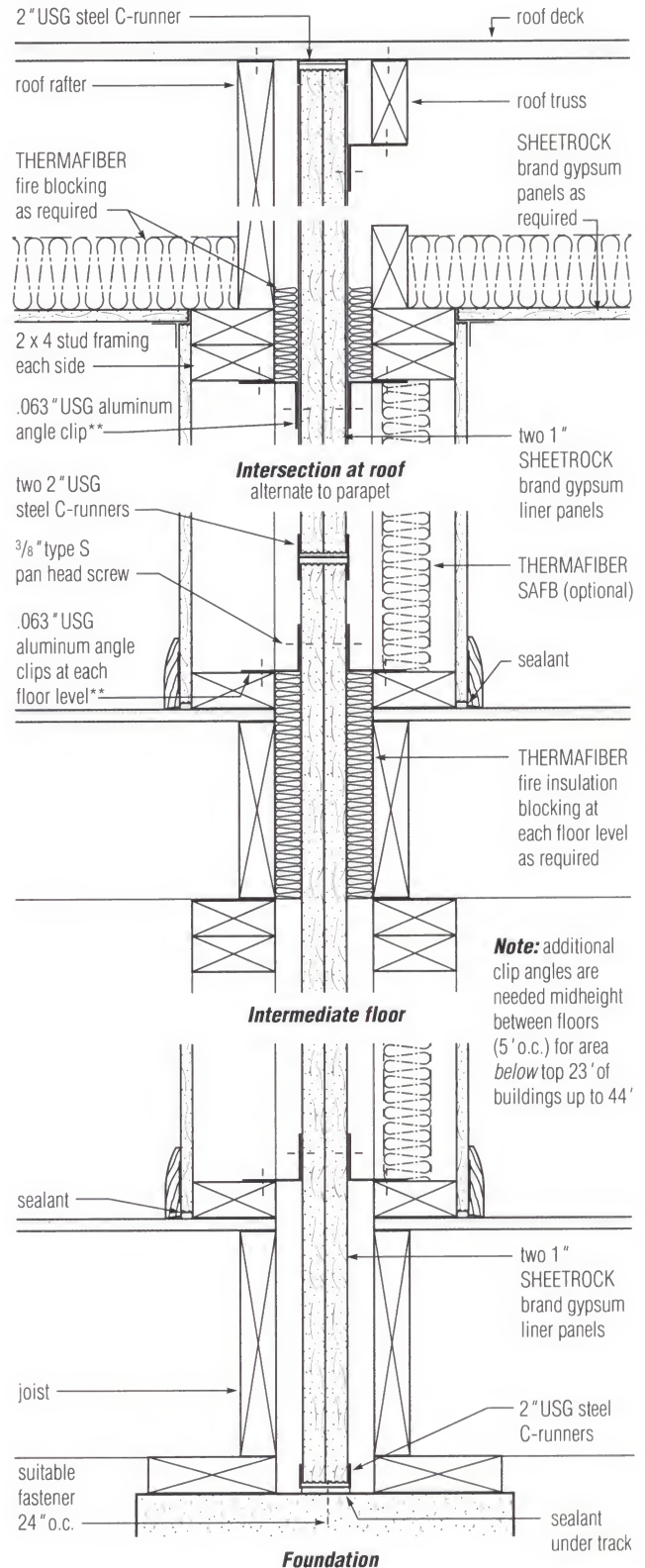


for additional details see USG cavity shaft wall systems/SA-926

Area Separation Fire Wall/Party Wall

Details - UL Design U336

Note: As required by code, 5/8" SHEETROCK brand gypsum panels, FIRECODE core, may be used as underlayment to the untreated roof sheathing with panels extending 4' on both sides of area separation wall and possibly roof side at rake end. Clip placement below is for typical construction.



Note: additional clip angles are needed midheight between floors (5' o.c.) for area below top 23' of buildings up to 44'

for additional details see USG area separation walls/SA-925

Good Design Practices

- 1 Specifications**—The following comments and recommendations cover basic specifications for normal job requirements and are intended as minimum guide specifications which can be adapted to specific projects and conditions. These specifications are not intended to cover every possible design or job condition, but rather to assist in preparation of specifications.
- 2 Related Systems**—Description, details and specifications on various systems are covered in these pertinent USG Corporation folders:
SA-700 USG Exterior Products & Systems
SA-707 THERMAFIBER Life-Safety Fire Containment Systems
SA-727 USG Fire Stop System for Floor and Wall Penetrations
SA-923 Drywall/Steel Framed Systems
SA-924 Drywall/Wood Framed Systems
SA-925 USG Area Separation Fire Wall/Party Wall Systems
SA-926 USG Cavity Shaft Wall Systems
SA-932 DUROCK Cement Board Systems
SA-933 Texture and Finish Products
- 3 Protection**—Light gauge metal components such as steel studs and runners, furring channels and resilient channels should be given adequate protection in the warehouse and on the jobsite against rusting caused by moisture. In marine areas such as the Caribbean, Florida and the Gulf Coast where chloride as well as sea salt is present in combination with excessively high humidity, use of components which offer increased protection against corrosion is recommended.
- 4 Shadowing and Spotting**—Temperature differentials on the interior surface of exterior walls may result in collection of airborne dirt on the colder surface areas. Consequently accumulated dirt in the form of shadowing and spotting may occur at locations of fasteners or framing where surface temperatures usually are lowest. This is a natural phenomenon which occurs through no fault of the products.

Where temperature, humidity and soiling conditions are expected to cause objectionable shadowing and spotting, one of the following alternatives should be considered:

- A** The interior facing of SHEETROCK brand Gypsum Panels, Foil-Back, should be furred from the exterior wall studs using a base layer of panels screw-attached to the studs and horizontally applied metal furring channels spaced 24" o.c.
 - B** On exterior masonry walls, install rigid or semi-rigid insulation between SHEETROCK Z-Furring Channels affixed to the interior side of wall and finish with SHEETROCK brand Gypsum Panels, Foil-Back.
 - C** For maximum resistance to shadowing and spotting, a separate free-standing wall construction is recommended using studs that are independent of the exterior wall.
- 5 Painting Systems**—For satisfactory results, painting products and systems should be used which comply with recommendations and requirements in Appendixes of ASTM C840.

For priming and decorating with paint, texture or wall covering, follow manufacturer's directions for materials used. All surfaces, including applied joint compound, must be thoroughly dry, dust-free, and not glossy. Prime with SHEETROCK First Coat or with an undiluted, interior latex flat paint with high-solid content. Allow to dry before decorating.

To improve fastener concealment, where gypsum panel walls and ceilings will be subjected to severe artificial or natural side lighting and be decorated with a gloss paint (egg shell, semi-gloss or gloss), the gypsum panel surface should be skim coated with joint compound to equalize suction and texture differences between the drywall face paper and the finished joint compound before painting.

- 6 Note**—United States Gypsum Company reserves the right to make changes or improvements in the design of all cataloged items without notice and without obligation to incorporate these changes or improvements in items already manufactured.
- 7 Additional Information**—See United States Gypsum Company technical folders in this series and in Sweet's General Building File. See *UN-30 UNIMAST Steel Framing Systems: Technical Information* for data on steel products.

Architectural Specifications

Part 1: General

1.1 Scope—Specify to meet project requirements.

1.2 Qualifications

All material described in this Folder manufactured by or for United States Gypsum Company shall be installed in accordance with its current printed directions.

All studs, runners and other accessories identified as USG or SHEETROCK products in this catalog are marketed by United States Gypsum Company as integral components of our gypsum board systems. Upon request United States Gypsum Company will provide certification that these products conform to the applicable Company and ASTM standards as well as meet the performance values identified herein.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Environmental Conditions

In cold weather and during gypsum panel joint finishing, temperatures within the building shall be maintained within the range of 55° to 70°F (13° to 21°C). Adequate ventilation shall be provided to carry off excess moisture.

Part 2: Products

2.1 Materials

A Interior Panels

—Gypsum Panels (in lengths as long as practical to minimize number of joints):

SHEETROCK brand (Regular, SW Edge, FIRECODE Core, FIRECODE C Core, ULTRACODE Core) Gypsum Panels (thickness).

SHEETROCK brand Foil-Back (Regular, SW Edge, FIRECODE Core, FIRECODE C Core) Gypsum Panels (thickness).

SHEETROCK brand Water-Resistant (Regular, FIRECODE Core, FIRECODE C Core) Gypsum Panels (thickness).

TEXTONE Vinyl-Faced Gypsum Panels (type) (pattern) (thickness).

—Gypsum Coreboard: SHEETROCK brand Gypsum (Coreboard) (Liner Panel) (length).

Interior Ceiling Board: SHEETROCK brand Interior Gypsum Ceiling Board (length).

B Exterior Panels

—Gypsum Sheathing: (SHEETROCK brand Gypsum Sheathing, GYP-LAP Gypsum Sheathing) (FIRECODE) (size) (thickness).

—Exterior Ceiling Board: SHEETROCK brand Exterior Gypsum Ceiling Board (thickness).

C Interior Steel Framing

—Steel Studs: 158ST25 (1½"), 212ST25 (2½"), 358ST25 (3¾"), 400ST25 (4"), 600ST25 (6"), 212ST22 (2½"), 358ST22 (3¾"), 400ST22 (4"), 600ST22 (6"), 212ST20 (2½"), 358ST20 (3¾"), 400ST20 (4"), 600ST20 (6").

—Steel Runners: 158CR25 (1½"), 212CR25 (2½"), 358CR25 (3¾"), 400CR25 (4"), 600CR25 (6"), 212CR22 (2½"), 358CR22

(3/8"), 400CR22 (4"), 600CR22 (6"), 362CR20 (3/8"), 400CR20 (4").

D Exterior Steel Framing

—SJ Style Studs: 362SJ20 (3/8"), 362SJ18 (3/8"), 362SJ16 (3/8"), 362SJ14 (3/8"), 40SJ20 (4"), 40SJ18 (4"), 40SJ16 (4"), 40SJ14 (4"), 60SJ20 (6"), 60SJ18 (6"), 60SJ16 (6"), 60SJ14 (6"), 725SJ18 (7/4"), 725SJ16 (7/4"), 725SJ14 (7/4"), 80SJ18 (8"), 80SJ16 (8"), 80SJ14 (8").

—Runners: Select CR-runner to match stud style.

E USG Cavity Shaft Wall & Area Separation Fire/Party Wall

—Cavity-Type Area Separation Wall Materials: USG Steel CR-Runners (style), USG Steel C-H Studs and E-Studs (style), USG Aluminum Breakaway Clip.

—Cavity Shaft Wall Materials: USG Steel J-Runners (style), USG Steel C-H Studs (style), USG Steel E-Studs (style), USG Steel Jamb Struts (style).

—Solid-Type Area Separation Wall Materials: USG Steel CR-Runners (style), USG Steel H-Studs (style), USG Aluminum Breakaway Clip.

F Furring Accessories

—Metal Furring Materials: (Metal Furring Channels and Clips) (Adjustable Wall Furring Brackets) (Cold-Rolled Channels 3/4" or 1 1/2") (SHEETROCK Z-Furring Channels).

—Resilient Channels: RC-1 Resilient Channel.

G Fasteners

—Drywall Screws: size: (3/8")(7/16")(1/2")(1")(1 1/4")(1 1/2")(1 3/4")(2") (2 1/4")(2 1/2")(3") style: (framing—Type S or S-12) (drywall—Type S) (self-drilling—Type S-12) (laminating—Type G) (coarse thread—Type W) head: (bugle) (pan) (trim) (pancake) (low-profile) (mod. truss head) coating: (reg) (corrosion-resistant).

—Drywall Nails: (length) (type) (conforming with ASTM C514) (as specified in fire-resistive construction).

H Adhesives

Drywall Adhesives: (SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound 210 or 90) (SHEETROCK All Purpose or Taping Joint Compound Ready-Mixed).

I Insulation

—THERMAFIBER Sound Attenuation Fire Blankets (thickness)(width).

—THERMAFIBER Commercial Insulation Blankets (thickness)(width).

J Trim Accessories

—Corner Angles: Metal Angles, 2 1/2"x2 1/2"x24-ga. corrosion-resistant steel, lengths as required.

—Corner Reinforcement: (DUR-A-BEAD Corner Bead No. 103, 104) (SHEETROCK No. 800).

—Metal Trim: SHEETROCK Metal Trim No. (200-A 1/2" or 3/4", 200-B 1/2" or 3/4", 400, 401 or 402, 801-A 1/2" or 3/4", 801-B 1/2" or 3/4").

—Control Joint: SHEETROCK Zinc Control Joint No. 093.

K Plastic Trim Mouldings

Plastic Trim: USG (P-1) (RP or RPV Series), Vinyl Trim.

L Finishing Products

—Joint Treatment: SHEETROCK Joint Tape. SHEETROCK Fiberglass Drywall Tape (must use a setting-type joint compound for first coat over tape). SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound (20, 45, 90, 210, 300). SHEETROCK Joint Compound (Taping, Topping, All Purpose). SHEETROCK Lightweight All Purpose Joint Compound (AP LITE). SHEETROCK Ready-Mixed Joint Compound (Taping, Topping, All Purpose). SHEETROCK Lightweight All Purpose Joint Compound Ready-Mixed (PLUS 3).

—Concrete Finishing Compound: (SHEETROCK Setting-Type

(DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound) (COVER COAT Compound) (as ready-mixed) (with sand additive).

M Firestop

Firestop: FIRECODE Compound.

N Acoustical Sealant

Sealant: SHEETROCK Acoustical Sealant.

O Decorating

Prime Coat: SHEETROCK First Coat.

Part 3: Execution

3.1 Gypsum Panel Application

3.1.1 Basic Single-Layer System, Treated Joints

- A** Position all ends and edges of all gypsum panels over framing members, except when joints are at right angles to framing members as in perpendicular application or when end joints are backblocked.
- B** Apply gypsum panels first to the ceiling and then to the walls. Extend ceiling board into corners and make firm contact with top plate. To minimize end joints, use panels of maximum practical lengths. Fit ends and edges closely, but not forced together. Stagger end joints in successive courses with joints on opposite sides of a partition placed on different studs.
- C** Attach panels to framing supports by: (Standard Single Nailing Method) (Adhesive Application) (Double Nailing Method) (Power-driven Screws). Space fasteners not less than 3/4" from edges and ends of panels and drive as recommended for specified fastening method. Drive fasteners in field of panels first, working toward ends and edges. Hold panel in firm contact with framing while driving fasteners. Drive fastener heads slightly below surface of gypsum panels in a uniform dimple without breaking face paper.
- D** Cut ends, edges, scribe or make cutouts within field of panels in a workmanlike manner. Gypsum board should be cut to size utilizing a knife and a straight edge. A power saw should be used only if it is equipped with a dust collection device.
- E** Install trim at all internal and external angles formed by the intersection of either panel surfaces or other surfaces. Apply corner bead to all vertical or horizontal external corners in accordance with manufacturer's directions. (Multilayer systems: see pertinent United States Gypsum Company System Folders.)

3.1.2 SHEETROCK brand Gypsum Panels, Water-Resistant—(see United States Gypsum Company Folder SA-924.)

3.1.3 Lamination of Gypsum Panels to Interior Monolithic Concrete and Unit Masonry

- A** The masonry or concrete shall be clean, smooth and dry prior to application. If wood base is to be used, attach wood nailer to wall before lamination is started.
- B** Cut face panels to allow continuous clearance (1/8" to 1/4") at floor. Apply SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound, or SHEETROCK All Purpose or Taping Joint Compound Ready-Mixed at center and near each panel edge in strips consisting of 4 beads, 3/8" wide x 1/2" high and spaced 1 1/2" to 2" o.c. Position panels vertically over wall surface, press into place and provide temporary support until adhesive is hardened.
- C** Install trim at all intersections of panel surfaces with other surfaces.
- D** Lamination to interiors below grade or directly to interior surfaces of exterior walls, and lamination where exposure to moisture is extreme or continuous, are not recommended.

3.2 RC-1 Resilient Channel Erection

(See specifications in Systems Folders SA-923 and SA-924.)

3.3 Steel Stud and Runner Erection

(See specifications in Systems Folder SA-923.)

3.4 Metal Furring Channel Erection

(See specifications in Systems Folder SA-923.)

3.5 USG High Performance Floor/Ceiling Erection

(See specifications in Systems Folder SA-924.)

3.6 USG Area Separation Wall Erection

(See specifications in Systems Folder SA-925.)

3.7 USG Cavity Shaft Wall Erection

(See specifications in Systems Folder SA-926.)

3.8 Control Joint Installation

Attach SHEETROCK Zinc Control Joint No. 093 with Bostitch $\frac{5}{16}$ " "G" staples or equal spaced not over 6" apart in each flange. Cut end joints square and align for neat fit. Remove protective tape when joint treatment is completed.

3.9 Fastener and Adhesive Application

3.9.1 Drywall Screws

Power-drive with an electric screwdriver so screwheads provide a slight depression below surface of gypsum panels without breaking face paper. Do not drive screws closer than $\frac{3}{8}$ " from edges and ends of gypsum panels.

3.9.2 Nails

Drive nails with heads slightly below gypsum panel surface in a uniform dimple $\frac{1}{32}$ " deep formed by crowned face of hammer. Drive nails no closer than $\frac{3}{8}$ " from edges and ends of panel.

3.9.3 Adhesive

Mix and apply in accordance with manufacturer's directions, and as follows:

- A** Apply SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound in the prescribed manner to back of face panels to be laminated. Laminate face panels to (base layer panels) (coreboard) using moderate pressure and temporary nailing or shoring to ensure adequate bond.
- B** Apply stud adhesive in a continuous $\frac{3}{8}$ " bead at center of attachment to face of framing members. Where two gypsum panels meet on a framing member, apply two parallel beads on face of framing at panel joints. Do not apply adhesive to members such as bridging, diagonal bracing, etc., into which no supplemental fasteners will be driven. Immediately following contact of panel to adhesive, apply necessary fasteners 16" o.c. around perimeter of panel, $\frac{3}{8}$ " away from edges and ends. On ceilings only, apply one temporary field fastener per framing member at mid-width of board; remove after 24 hours. With predecorated panels pre-bowed and applied vertically, use permanent fasteners only at top and bottom of panel.
- C** Apply laminating adhesive in strips to center and along both edges of gypsum face panel. Apply strips with a notched metal spreader having four $\frac{1}{4}$ "x $\frac{1}{4}$ " minimum notches spaced max. of 2" o.c. Position face panels against base panels; fasten at top and bottom (vertical application) as required. For laminated ceilings, space fasteners 16" o.c. along edges and ends, with one permanent field fastener per framing member installed at mid-width of panel. Press panel into place with firm pressure to ensure bond; press again within 24 hr. if necessary.
- D** Apply liquid contact adhesive with a short nap paint roller to cover both contact surfaces according to adhesive manufacturer's directions. Let adhesive air dry to the touch. Apply panels as soon as possible after drying occurs. On walls, fasten 16" o.c. at top and bottom (vertical application) as required. In ceiling lamination, apply permanent supplementary fasteners at each corner of panel, and along edges spaced max. 48" o.c. Press panel into place with firm pressure to ensure bond.
- E** Apply construction adhesive in continuous $\frac{3}{8}$ " beads to framing. On walls, apply a continuous adhesive bead to center of studs to within 6" of board perimeter. At panel joints, apply two adhesive

beads—one at a time—as each panel is installed. Do not apply adhesive at inside corners or to top and bottom plates, bridging, bracing and fire stops. Apply no more adhesive than can be covered in 15 min. Set panel in place, fasten 16" o.c. along top and bottom of panel and impact by hand along stud.

3.10 Pre-Fill Application

- A** Mix SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound according to directions on bag. Do not overmix, or use extremely cold water or cold joint compound.
- B** Pre-fill all "V"-grooves formed by abutting tapered eased edges of SHEETROCK brand Gypsum Panels, SW Edge, with SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound using a flexible 5" or 6" joint finishing knife or Ames Pre-Fill Tool. Fill "V" joint flush and wipe off excess compound beyond the "V" groove, leaving a clear depression to receive tape. Allow pre-fill to harden prior to the next application (tape or embedding coat).

3.11 Joint Treatment Application

3.11.1 SHEETROCK Joint Tape

- A** Mix joint compound in strict accordance with manufacturer's recommendations.
- B** Apply joint compound in a thin uniform layer to all joints and angles to be reinforced. Immediately apply SHEETROCK Joint Tape centered over joint and seated into compound. Sufficient compound—approx. $\frac{1}{64}$ " to $\frac{1}{32}$ "—must remain under the tape to provide proper bond. Follow immediately with a thin skim coat to embed tape, but not to function as a second coat. Fold and embed tape properly in all interior angles to provide a true angle. The tape or embedding coat must be thoroughly dry prior to application of second coat. (Exception: DURABOND Setting-Type and EASY SAND Lightweight Setting-Type Joint Compounds need only have hardened prior to application of next coat.)
- C** Apply second coat of joint compound over embedding coat, filling panel taper flush with surface; cover tape and feather out at least 2" beyond first coat. On joints with no taper, cover the tape and feather out at least 4" on either side of tape. Allow second coat to dry thoroughly prior to application of finish coat. (Exception: DURABOND Setting-Type and EASY SAND Lightweight Setting-Type Joint Compounds need only have hardened prior to second coat application.)
- D** Spread finish coat evenly over and extend at least 2" beyond second coat on all joints and feather to a smooth uniform finish. Do not allow finished joint to protrude beyond plane of the surface. Apply a finish coat to cover tape and taping compound at all tapered angles and provide a true angle. Where necessary, sand lightly between coats and following the final application of compound to provide a smooth surface ready for decoration. When sanding take care not to roughen face paper.

3.11.2 SHEETROCK Fiberglass Drywall Tape

- A** Mix joint compound in strict accordance with manufacturer's recommendations.
- B** Center and apply SHEETROCK Fiberglass Drywall Tape directly over joint, pressing tape firmly so that it adheres evenly to surface. To eliminate wrinkles and ensure maximum bond, press entire length of tape with drywall knife. Avoid overlapping tape at intersections. Cut tape with drywall knife.
- C** Cover with a layer of SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound, forcing compound through the tape with a drywall knife/trowel to completely fill and level the joint. Failure to completely fill the joint may result in cracking. Let dry and sand lightly as required.

- D** Apply second coat of SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound, or SHEETROCK Drying-Type Joint Compound (powder or ready-mixed), feathering approximately 2" beyond first coat. Let dry and sand lightly as required.

3.12 Finishing Fasteners

Apply a setting-type, or all-purpose or lightweight all-purpose compound to fastener depressions as the first coat. Follow with a minimum of two additional coats of topping or all-purpose compound, leaving all depressions level with the surface. (Exception: Setting-type and lightweight all-purpose joint compounds need only one additional coat.)

3.13 Finishing Beads and Trims

- A** Apply first coat to all bead and trim and properly feather out from ground to plane of surface. Compound must thoroughly dry prior to application of second coat. (Exception: SHEETROCK Setting-Type (DURABOND) and Lightweight Setting-Type (EASY SAND) Joint Compounds need only have hardened prior to application of next coat.)
- B** Apply second coat in same manner as first coat, extending compound slightly beyond face of panel. Compound must be thoroughly dry prior to application of finish coat. (Exception: setting-type joint compounds need only have hardened prior to application of next coat.)
- C** Apply finish coat to all bead and trim, extending compound slightly beyond the second coat and properly feathering from ground to plane or surface. (Exception: Only two coats of SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound or SHEETROCK Lightweight All Purpose Joint Compound Ready-Mixed (PLUS 3) are needed). When dry, sand finish as necessary to provide a flat smooth surface ready for decoration. When sanding take care not to roughen face paper.

3.14 Exterior Joint System Application

- A** Mix SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound according to directions on the bag. Do not overmix, nor use in temperatures below 45°F.
- B** Pre-fill joints of SHEETROCK brand Exterior Gypsum Ceiling Board with SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound. After pre-fill has hardened, embed SHEETROCK Joint Tape centered over joint. When compound has hardened, immediately apply fill coat.
- C** Apply SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound over flanges of SHEETROCK Zinc Control Joints, metal beads and trim. Spot fastener heads.
- D** After fill coat has hardened, apply finishing coat of SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound. Completely cover all joints, angles, beads, control joints and fasteners.

Note: After SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound has dried, apply one coat oil-based primer-sealer and one coat exterior oil or latex paint over entire surface.

3.15 Filling and Finishing Interior Concrete

- A** Concrete surfaces shall be clean, smooth, dry and free from contaminants and exposed metal protected with a rust-inhibitive primer and allowed to dry.
- B** Fill offsets and voids with a SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound.
- C** Mix (COVER COAT Compound) (SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint

Compound) according to manufacturer's directions and apply to concrete (ceilings) (columns) before interior partitions are erected. Coordinate application of SHEETROCK No. 800 Corner Bead on angles and corners as required, embedding and covering both flanges with a smooth fill of compound 3" to 4" wide. Apply sufficient coats to obtain a smooth surface. If SHEETROCK Setting-Type Joint Compound (DURABOND) is used, and if an easier sanding surface is desired, then apply a skim coat of COVER COAT Compound over entire surface. After compound has dried, sand to a smooth surface suitable for decoration.

Technical Literature

For complete information, specifications and construction details on United States Gypsum Company products and systems, contact your local United States Gypsum Company sales office for the catalogs shown below.

SA-700 USG Exterior Products & Systems
SA-707 THERMAFIBER Life-Safety Fire Containment Systems
SA-727 USG Fire Stop System for Floor and Wall Penetrations
SA-923 Drywall/Steel Framed Systems
SA-924 Drywall/Wood Framed Systems
SA-925 USG Area Separation Fire Wall/Party Wall Systems
SA-926 USG Cavity Shaft Wall Systems
SA-927 Gypsum Panels & Accessories
SA-928 TEXTONE Vinyl-Faced Gypsum Panels
SA-932 DUROCK Cement Board Systems
SA-933 Texture and Finish Product

Metric Specifications

USG Corporation, through its operating subsidiaries, will provide metric conversions on its products and systems to help specifiers match metric design sizes. In addition, some products are available in metric dimensions from selected manufacturing plants. Refer to SA-100 Construction Selector for additional information and a Table of Metric Equivalents.

Product Information and Literature: 1-800-USG-4YOU (1-800-874-4968).

Sales Offices: Arizona: Phoenix, (602) 866-0795; California: Fremont, (510) 792-4400, Glendale, (818) 956-1882; Florida: Jacksonville, (904) 764-3293, Miami, (305) 557-4501; Georgia: Atlanta, (404) 393-0770; Hawaii: Honolulu, (808) 591-8815; Illinois: Chicago, (312) 606-5488; Indiana: Indianapolis, (317) 848-1513; Louisiana: New Orleans, (504) 241-2020; Maryland: Baltimore, (410) 355-2200; Massachusetts: Charlestown, (617) 241-8530; Michigan: Southfield, (313) 569-1900; Minnesota: Bloomington, (612) 854-4233; Missouri: St. Louis, (314) 349-0980; New York: Albany, (518) 458-7437, Oakfield, (716) 948-5287, Stony Point, (914) 786-2820; North Carolina: Charlotte, (704) 552-7402; Ohio: Cleveland, (216) 899-7333; Oregon: Beaverton, (503) 626-8864; Pennsylvania: Philadelphia, (410) 355-2200, Pittsburgh, (800) 289-4874; Tennessee: Nashville, (615) 361-8419; Texas: Dallas, (214) 490-0771, Houston, (713) 868-9937; Utah: Salt Lake City, (801) 266-4975; Virginia: Richmond, (804) 285-7528; International Division: Chicago, (312) 606-5840.

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United States Gypsum Company

125 South Franklin Street
P.O. Box 806278
Chicago, Illinois 60680-4124
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